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A WEST AMERICAN JOURNAL OF BOTANY

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THE NAVAJO YUCCA, A NEW SPECIES FROM NEW MEXICO

John Milton Webber

In May, 1944, while on a yucca survey, the writer and his father, Herbert John Webber, found what they believe to be a new species of *Yucca*. Since this attractive little yucca was found on the Navajo Indian Reservation, near Tohatchi, New Mexico, it is a pleasure to name it in honor of the Navajo Indians.

Yucca navajoa sp. nov. Caulescens caudice erecto demum 1.2 m. alto simplici vel breviramoso ad rosulam vel paulum infra; foliis rigide patentibus pungentibus linearibus vel oblanceolatis, tenuibus sed tamen firmis, anguste albomarginatis, mox tenuiter et saepe crispe filiferis, 5–10 mm. latis, 11.5–41 cm. longis; inflorescentia racemosa densiflora glabra, 0.5–1.1 m. longa, pedunculo brevi, haud vel raro folia superanti; floribus albis plus minusve purpureo-tinctis, globoso-campanulatis, segmentis perianthii latis acutis, sepalis 17–32 mm. latis, 34–58 mm. longis, petalis 24–37 mm. latis, 35–56 mm. longis; filamentis 15–28 mm. longis; pistillis 7–10 mm. diametro, 24–31 mm. longis, ovario pallide viridi lato tumidoque, suturas carpellorum prominentes et depressiones antherarum leves ferenti, stylo pallide viridi vel albescenti, gracili, 6–10 mm. longo; capsulis (immaturis) late oblongis, 27–35 mm. latis, 62–70 mm. longis, haud vel valde constrictis paulum supra medium, capsulis seminibusque maturis ignotis.

Plants forming, at length, a very dense, compact, mass of rosettes, ranging from 1–44 and averaging 10 rosettes per plant, with 0.75–1.47 rosettes per square foot of soil; caudex, from soil level to center of rosette, 0–1.2 m., mainly 0.4–0.7 m. high, 5–8 cm. in diameter, simple or with 2–4 short branches each terminating in 1–3 rosettes; leaves thin but firm, rigid, spreading, dagger-like, linear to oblanceolate, narrowly white-margined, from 5–10 mm. (averaging 8 mm.) wide and 11.5–41.0 cm. (averaging 23 cm.) long; racemes densely flowered, 0.5–1.1 m., but usually 0.7–0.8 m. long; peduncles short, rarely extending above the leaf rosette; flowers short and opening widely, or long, narrow, and remaining closed; sepals generally purple-tinged, 17–32 mm. (averaging 20 mm.) wide, and 34–58 mm. (averaging 43 mm.) long; petals white or slightly purple-tinged, 24–37 mm. (averaging 29 mm.) wide, and 35–56 mm. (averaging 42 mm.) long; pistils 7–10 mm. (averaging 8 mm.) in diameter, and 24–31 mm. (averaging 28 mm.) long; ovary light to dark green, thick, ending abruptly in the style; style white to pale green, gradually tapering into the stigma, 6–10 mm. (averaging 8 mm.) long; filaments generally abruptly bending outward at or near base of style, 15–28 mm.

Corrected date line: Madroño, Vol. 8, pp. 65–104. August 7, 1945.
Madroño, Vol. 8, pp. 105–144. November 5, 1945.

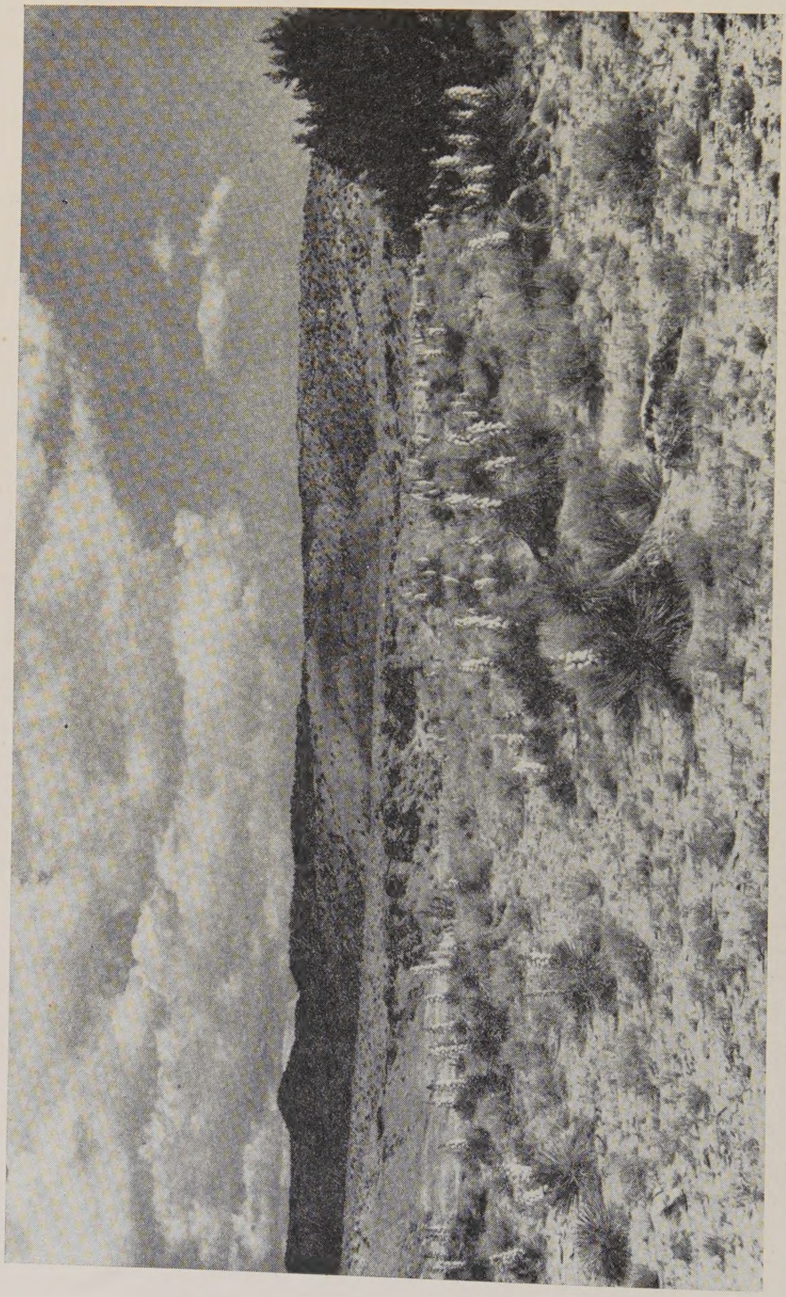

Plate 10. Yucca navajoa. Type locality 4.9 miles northeast of Tohatchi, New Mexico, May 28, 1944.

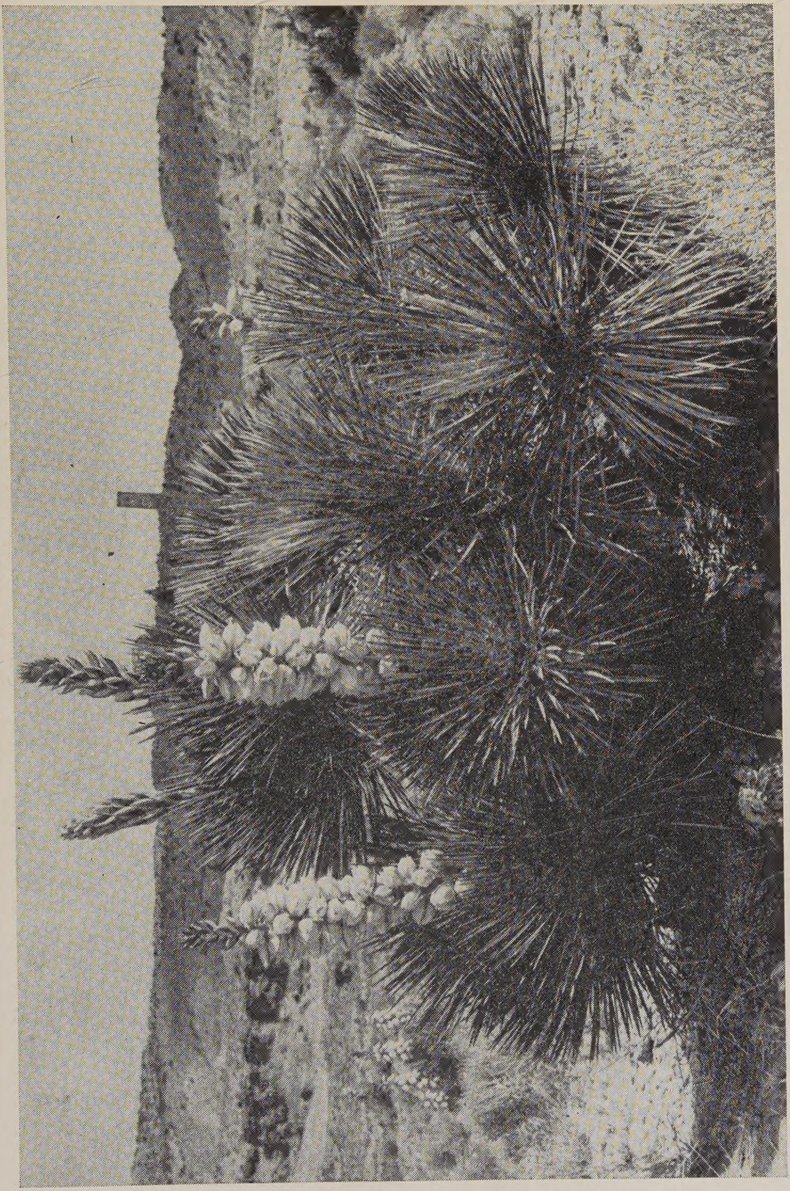

PLATE 11. YUCCA NAVAJOA. Plant from which type specimen was collected, May 28, 1944.

(averaging 21 mm.) long; capsules (immature, 3 to 4 weeks old) broadly oblong, 27–35 mm. (averaging 32 mm.) wide, 62–70 mm. (averaging 67 mm.) long, and from deeply constricted to not constricted.

Type. West side of United States Highway 666, 4.9 miles northeast of Tohatchi, Eastern Navajo Indian Reservation, McKinley County, New Mexico, May 28, 1944, *Webber 300* (United States National Herbarium no. 1872608). At this location there is a mesa referred to by the writer as Yucca Point. This point extends north and west covering an area of from 0.75 to 1.00 square mile, is rather sandy and rocky, and has an elevation of between 6000 and 6500 feet. The luxuriant growth of *Yucca navajoa* growing at Yucca Point is shown in Plate 10. The plant from which the type specimen was collected is shown in Plate 11.

Topotype collections. From type plant, May 28, 1944, *301;* from different plants on Yucca Point, showing typical variations within the species, *302–306, 308;* typical leaf from each of fifteen plants, *307;* a young shoot, June 9, 1944, *299;* pod from type plant, *54;* preserved pistils and stamens from several plants, *8*. All collection numbers are those of the author.

Yucca navajoa belongs to the *Y. glauca* complex (*Yucca glauca* Nutt., *Y. Baileyi* Woot. and Standl., *Y. angustissima* Engelm. ex Trel., and *Y. constricta* Buckley), and is most closely related to *Y. Baileyi*. It, however, differs more from *Y. glauca* than any other species or form of the complex. *Y. navajoa* is unique in that it is the only species in the group with dense clumping mainly due to the branching of an aerial caudex. The formation of a caudex itself is rather unusual, as elongated aerial stems are rarely formed within the *Y. glauca* group, and all other species of the group have been described as acaulescent. A third distinction of the species is the characteristic small leaves, these being mainly linear, but often oblanceolate.

Aside from the preceding major distinctions, *Y. navajoa* differs from *Y. glauca* in that the inflorescence is strictly racemose and densely flowered, the peduncle is short and never extends above the leaves. It also differs from some of the various *Y. glauca* forms in flower color, pistil color and shape, and in the prominence of carpel sutures and of anther depressions on the ovary. *Y. navajoa* has many more leaf rosettes per plant than *Y. Baileyi* and slightly smaller flowers and flower parts. Additional distinctions of the species from *Y. angustissima* and *Y. constricta* are the comparatively large capsules and short peduncle of *Y. navajoa.*

About 20 miles north of Gallup, New Mexico, there is a group of yuccas, which approach *Y. navajoa.* In this vicinity, however, both *Y. Baileyi* and *Y. glauca* occur. Since the plants on this hill show characters of the latter two species as well as of *Y. navajoa,* it is the writer's belief that they represent a complex group of hybrids and hybrid derivatives.

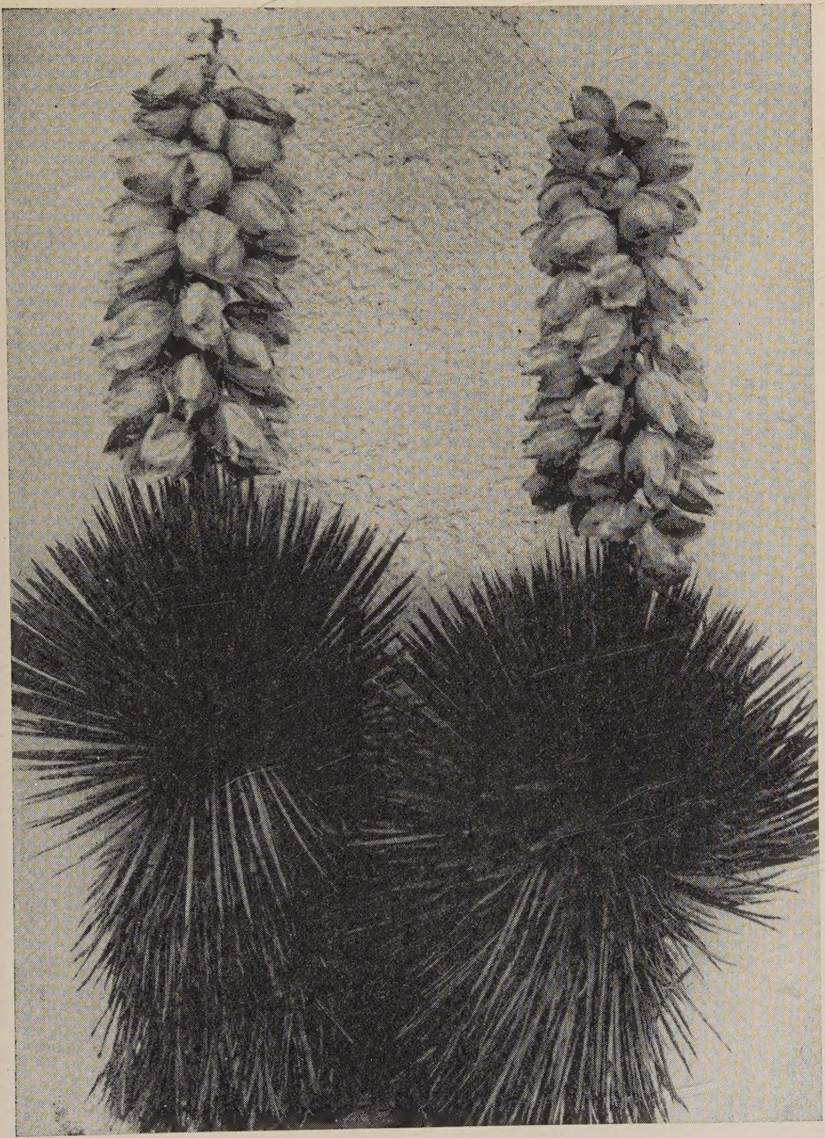

PLATE 12. YUCCA NAVAJOA. Typical plant of species occurring in the vicinity of type locality, May 28, 1944.

Although *Yucca navajoa* is known only from the vicinity of the type locality, plants which approach it have been found as follows: east side of United States Highway 666, 20 miles north of Gallup, New Mexico (not collected); Little Colorado Gorge, Coconino County, Arizona, September 26, 1935, *Kearney* and *Peebles* (United States Cotton Field Station, Sacaton, Arizona, herbarium no. 12819). The Little Colorado Gorge specimen is similar to *Yucca navajoa* in many respects and may prove to be that species. In 1937 Peebles annotated this specimen as a variety of *Y. angustissima* but it was never published. It differs from comparable specimens of *Y. navajoa* only in that the leaf fibers are considerably coarser and more curled. Field notes do not state the number and density of the leaf rosettes—one of the major distinguishing characters of *Y. navajoa.* In 1939 Miss McKelvey annotated this specimen and listed several places where she had found "just such a plant"; she referred it to an unpublished variety of *Y. Baileyi.* She also referred to this unpublished entity a specimen collected at Keams Canyon, Arizona (Sacaton herbarium no. 9374). The writer has carefully studied the yuccas in the vicinity of Keams Canyon, as well as those in the other localities mentioned by McKelvey. In none of these localities have plants similar to the Little Colorado Gorge specimen, or to *Y. navajoa,* been found by the writer. More or less dwarf yuccas occur at the various localities, but none with trunks and oblanceolate leaves characteristic of either the Little Colorado Gorge collection of Kearney and Peebles or *Y. navajoa* has been found. In addition, no yuccas in the localities listed by McKelvey exhibit the major distinguishing growth characters of *Y. navajoa.* The writer has not visited Little Colorado Gorge, Arizona.

Field and experimental plot studies of all southwestern yuccas, as well as nanate forms of several species, strongly indicate that none of the distinguishing characters of *Y. navajoa* is induced by environment. The species, however, is now being subjected to further study in the wild and under cultivation.

The writer wishes to express grateful appreciation to his father, Herbert John Webber, University of California, for assistance given him during his yucca studies, and to John Thomas Howell, California Academy of Sciences, for translating the Latin description from English.

Fiber Crops Field Laboratory,
United States Department of Agriculture,
Riverside, California.

ADDITIONS TO THE OAK FLORA OF EL SALVADOR

JOHN M. TUCKER AND CORNELIUS H. MULLER

Among the plants collected by John Tucker, a member of the University of California Expedition to El Salvador, Central America, there occur twenty-three collections of *Quercus*. The expedition, under the leadership of Dr. R. A. Stirton of the Department of Paleontology, University of California, was in El Salvador from November, 1941, to May, 1942. Seven different areas in this country were visited by Mr. Tucker, although in only three of them were oaks observed and collected.

The first of these localities was 5100 foot Mount Cacaguatique in the Department of Morazán. Here eleven numbers comprising four species were obtained on, and in the vicinity of, the coffee finca of General José Tomás Calderón. Headquarters of the finca lie on the north side of the mountain at an elevation of 4600 feet. This side of the mountain above 3000 feet, where the original growth has not been cleared for coffee plantations, is occupied by oak woods. The dominant components are *Quercus hondurensis* Trel. and *Q. peduncularis* var. *sublanosa* (Trel.) Mull., and in a few small areas, particularly on dry ridges, *Pinus oocarpa* Schiede. A few scattered individuals of *Quercus Skinneri* Benth. and *Q. vicentensis* Trel. are to be found here also.

The second locality was the 9000 foot mountain, Los Esesmiles, which lies in, and near the northern boundary of, the Department of Chalatenango, not far from the Honduran border. The upper slopes of this mountain proved to be the most interesting and profitable botanically of any of the areas visited in El Salvador. Eleven numbers of *Quercus* were collected here, representing eight species: *Quercus acatenangensis* Trel., *Q. eugeniaefolia* Liebm., *Q. flagellifera* Trel., *Q. oocarpa* Liebm., *Q. sapotaefolia* Liebm., *Q. Seemanni* Liebm., *Q. vicentensis* Trel., and one herein described. The expedition camp was established at an elevation of 7200 feet on the eastern slope of the mountain. It was on this side of Los Esesmiles, which bears a dense, luxuriant cloud forest, that most of the collections were made.

The third locality where *Quercus* was collected was the area lying just to the north of the Volcán de Santa Ana, in the Department of Santa Ana. The upper slopes of this volcano, as well as those of several smaller extinct volcanic cones on its north flank, are clothed with forest growth which in general aspect is rather similar to the cloud forest of Los Esesmiles. Most of the dominant arboreal species are different in the two areas, however. On the east side of the 6000 foot Cerro Del Águila (one of the small, extinct cones), a single collection of *Quercus Skinneri* Benth. was made, representing the only oak species noted in this area.

Had these oak collections been available at the time of the preparation of "The Central American Species of Quercus"

(Muller, Cornelius H. U.S.D.A. Misc. Pub. 477: 1–216. 124 pl. 1942), they would of necessity have occasioned considerable amplification of that paper. El Salvador and Nicaragua were admitted to be very poorly represented in the then extant collections of *Quercus*. The specimens herein reported represent numerous extensions of range and one outstanding new species, and have provided additional information which might have permitted more full specific descriptions and decided improvements in the key to species.

In the following list of species no effort has been made to incorporate specific characters which might be added to our knowledge of the various species nor to revise the key to species to accommodate these characters. Such corrections are nearly valueless if presented separately from the complete treatment and are best left to accumulate until a full revision appears profitable.

The specimens comprising this collection are deposited in the Herbarium of the University of California at Berkeley; duplicates are being distributed. All cited collections are those of Tucker.

Subgen. *Lepidobalanus* (Endl.) Oerst.

Quercus oocarpa Liebm.? A collection without mature leaves is tentatively placed here. This would be the first collection of this species in El Salvador. *Quercus oocarpa* is known from Guatemala to Panama, and its occurrence in El Salvador would not be surprising.

Dept. Chalatenango. Small tree 20 feet tall; bark very light gray; cloud forest on north-facing slope, elevation *ca.* 7300 feet; east side of Los Esesmiles, April 4, 1942, *1200*.

Quercus peduncularis var. sublanosa (Trel.) Mull. This variety, occurring from Guatemala to Nicaragua, was previously known in El Salvador only from the Department of Chalatenango.

Dept. Morazán. Slender tree 25 feet tall; oak woods on northwest-facing slope, elevation *ca.* 3600 feet; *ca.* 3 miles east of finca of General J. T. Calderón, Mount Cacaguatique, January 12, 1942, *779*. Tree 30–35 feet tall; oak woods on northeast-facing slope; *ca.* ½ mile east of finca of General J. T. Calderón, Mount Cacaguatique, January 17, 1942, *808*.

Quercus vicentensis Trel. Known only from El Salvador. Previous collections were from the Department of San Vicente and from Comasagua, in the Department of La Libertad.

Dept. Morazán. Old tree 25–30 feet tall; leaves very pale glaucous beneath; elevation *ca.* 4900 feet; at top of "saddle," ¼ mile due south of hacienda buildings, finca of General J. T. Calderón, Mount Cacaguatique, January 17, 1942, *810*. Dept. Chalatenango. Tree 45 feet tall; top of dry ridge, elevation *ca.* 5000 feet; along trail from San Ignacio to Las Pilas, west side of Los Esesmiles, March 22, 1942, *1109*.

Plate 13. Quercus esesmilensis. Typical habitat at border of cloud forest.

Subgen. *Erythrobalanus* (Spach) Oerst.

Quercus hondurensis Trel. Previously known from El Salvador in the Department of Chalatenango and the Department of Morazán, additional localities in the latter department are now recorded for this species.

Dept. Morazán. Shrubby tree 10 feet tall; oak woods, elevation *ca.* 4500 feet; south-facing slope of easternmost peak, Mount Cacaguatique, January 2, 1942, *699*. Spreading tree 18 feet tall, very young leaves dark red, strongly revolute; oak woods, on north-facing slope, elevation *ca.* 3800 feet; *ca.* ½ mile northeast of finca of General J. T. Calderón, Mount Cacaguatique, January 6, 1942, *736*. Small trees *ca.* 20 feet tall; oak woods on north-facing slope, associated with *Pinus oocarpa* Schiede, elevation *ca.* 4250 feet; *ca.* ¾ mile east of finca of General J. T. Calderón, Mount Cacaguatique, January 11, 1942, *762, 762A*. Young tree 7 feet tall; oak-pine woods, on road bank, elevation *ca.* 4000 feet; *ca.* 2¼ miles east of finca of General J. T. Calderón, Mount Cacaguatique, January 11, 1942, *765*. Acorns and cups from under trees conspecific with no. *765;* elevation 3050 feet; *ca.* 4 miles east of finca of General J. T. Calderón, Mount Cacaguatique, January 11, 1942, *768*.

Quercus sapotaefolia Liebm. Previously known from only one locality in the Department of Chalatenango, this species may now be reported from another station.

Dept. Chalatenango. Tree *ca.* 18 feet tall; small stand on north-facing slope, elevation *ca.* 5200 feet; along trail from San Ignacio to Las Pilas, west side of Los Esesmiles, March 22, 1942, *1110*.

Quercus eugeniaefolia Liebm. Not previously recorded from El Salvador. The following collection represents a considerable extension of its known range from Panama and Costa Rica.

Dept. Chalatenango. Straight-trunked tree 45–50 feet tall, bark gray, longitudinally very shallowly fissured; border of cloud forest, on north-facing slope, elevation *ca.* 7200 feet; east side of Los Esesmiles, March 18, 1942, *1089*.

Quercus Seemanni Liebm. Previously known only from Panama and Costa Rica, this species is here recorded for the first time from El Salvador.

Dept. Chalatenango. Specimens from leaders 10–12 feet tall, arising from fallen tree 25 feet long; open, north-facing canyon slope, elevation *ca.* 7200 feet; east side of Los Esesmiles, April 1, 1942, *1182*. Straight-trunked tree 50–55 feet tall; cleared field on north-facing slope, elevation *ca.* 7100 feet; east side of Los Esesmiles, April 4, 1942, *1202*.

QUERCUS ACATENANGENSIS Trel. Not previously reported south of Guatemala where it is very widespread and abundant.

DEPT. CHALATENANGO. Spreading tree *ca.* 20 feet tall, elevation *ca.* 6000 feet; beside trail from San Ignacio to Las Pilas, west side of Los Esesmiles, March 22, 1942, *1115*.

QUERCUS FLAGELLIFERA Trel. Reported here for the first time from El Salvador. Widespread in Guatemala, although sparsely distributed.

DEPT. CHALATENANGO. Large, old tree, young foliage bronze-green, shining, leaves undulate margined; cloud forest on north-facing slope, elevation *ca.* 7200 feet; east side of Los Esesmiles, March 15, 1942, *1066*.

QUERCUS SKINNERI Benth. Ranges from Chiapas, Mexico, to Honduras. Previously recorded from the departments of Ahuachapán, Cuscatlán, and San Vicente of El Salvador. The small-fruited form (*Q. salvadorensis* Trel.) is represented by collections from the Department of Morazán, while the typical large-fruited form is represented by a collection from the Department of Santa Ana.

DEPT. MORAZÁN. Tree 35–40 feet tall, bark dark gray; coffee grove, on northwest-facing hillslope, elevation *ca.* 4700 feet; southeast of hacienda buildings, finca of General J. T. Calderón, Mount Cacaguatique, January 16, 1942, *800*. Tree 50 feet tall, bark black, thin, finely fissured; elevation *ca.* 4900 feet; at top of "saddle," $\frac{1}{4}$ mile due south of hacienda buildings, finca of General J. T. Calderón, Mount Cacaguatique, January 16, 1942, *801*. DEPT. SANTA ANA. Large tree 60–65 feet tall; in forest, elevation *ca.* 5500 feet; east side of Cerro del Águila, April 21, 1942, *1276*.

Quercus esesmilensis Tucker and Muller sp. nov. Arbor ad 16 m. alta; ramuli 2–3 mm. crassi, glabrati; folia sempervirentia, 10–18 cm. longa, 3.5–6 cm. lata, lanceolata vel ovato-lanceolata, attenuato-acuta, bases acutae vel rotundatae, glabratae exceptis subter cristatis axillaribus, venis utrimque 8–10, supra impressis, subtus prominentibus anastomosantibus, petioli 10–25 mm. longi, complanati dorsale, laminae foliorum in partibus superis petiolorum subtiliter decurrentibus; fructi biennes, cupulae 16–20 mm. latae, 5–10 mm. altae, squamae stricte appressae, glandes 20–25 mm. longae, 18–22 mm. latae, ovoidea, $\frac{1}{5}$ inclusae.

Tree 40 or 50 feet tall; twigs 2–3 mm. thick, fluted, at first loosely fulvous-stellate-tomentose, very quickly glabrate, dull brown or grayish with inconspicuous lenticels; buds about 2 mm. long, subrotund, light brown, dull or shiny, glabrate except for the ciliate scale margins; stipules 9–13 mm. long, broadly ligulate, dorsally glabrous, ventrally fulvous-stellate-tomentose, very quickly caducous; leaves evergreen, rather thick and coriaceous, 10–18 cm. (or 23 cm.) long, 3.5–6 (or more) cm. broad, narrowly

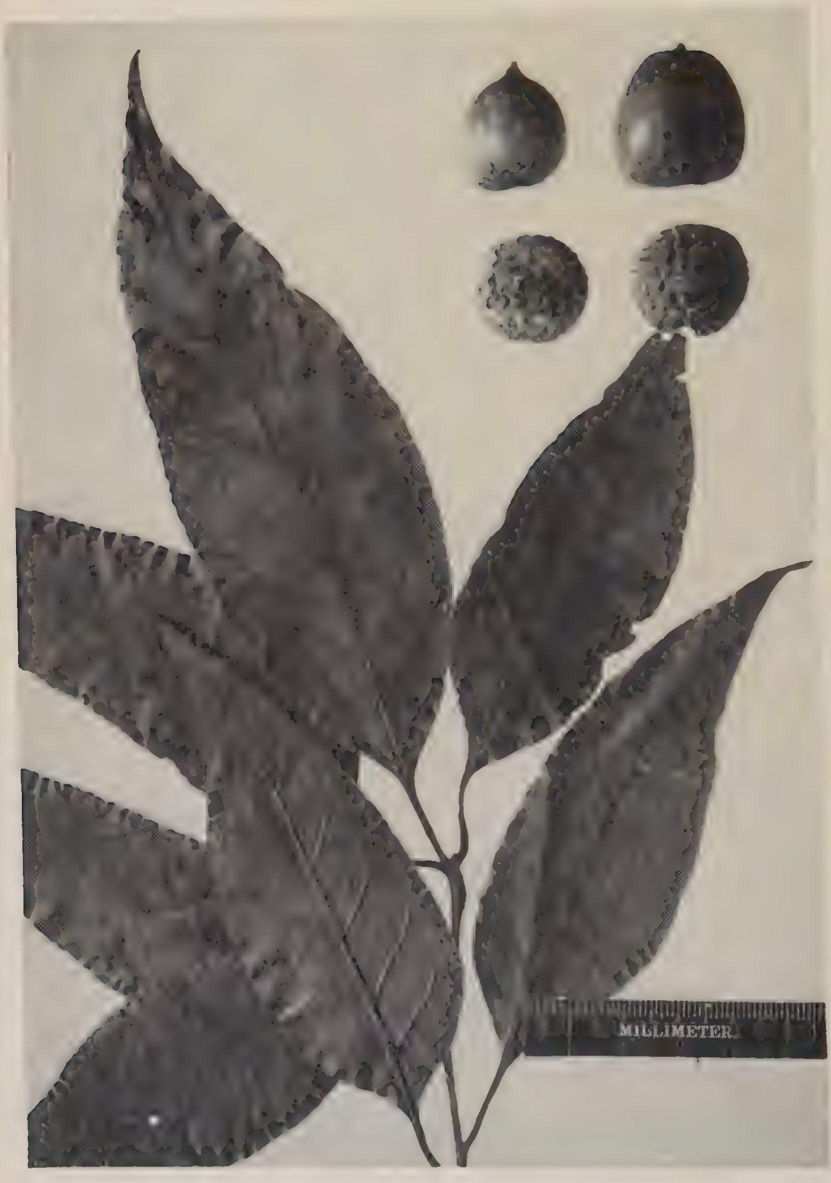

PLATE 14. QUERCUS ESESMILENSIS. Branchlet and fruits. (Note the persistent fulvous axillary tufts on ventral surface of leaf.)

elliptic-ovate to ovate or lanceolate, attenuately acute, the drip-tips without aristae, the bases often slightly unequal, rounded to acute, entire or rarely coarsely few-toothed, margins somewhat undulate, crisped, finely revolute, blades densely stellate-tomentose upon unfolding, quickly glabrate except the persistent fulvous axillary tufts beneath, both surfaces rather dull; veins 8–10 on each side, much branched and obviously anastomosing throughout, principal veins impressed above and raised within the depressions, quite prominent and reticulate beneath; petioles 10 to usually 15 or 25 mm. long, dorsally flattened, becoming glabrate, the leaf blade minutely decurrent on the upper portion; pistillate catkins 5–10 mm. long, 1- or 2-flowered, pedunculate; fruit biennial, solitary or paired on a peduncle 10–15 mm. long; cups 16 to usually 18 or 20 mm. broad, 5–10 mm. high, saucer-shaped to subhemispheric, margins not inrolled, scales flat, closely appressed, finely canescent but the tips glabrous, light brown and shiny; acorns usually 20–25 mm. long, 18–22 mm. broad, sometimes smaller, ovoid, broadly rounded to truncate at apex, $\frac{1}{5}$ included.

DEPT. CHALATENANGO. Large tree *ca.* 50 feet tall; border of cloud forest, on northwest-facing slope, elevation *ca.* 7700 feet; east side of Los Esesmiles, April 3, 1942, *1198* (type, Herb. Univ. Calif. no. 694107). Acorns from under trees conspecific with no. *1198;* cloud forest, elevation *ca.* 8900 feet; summit of southern peak of Los Esesmiles, April 3, 1942, *1199* (description of fruit from this collection). Tree *ca.* 40 feet tall; cloud forest, elevation *ca.* 8500 feet; east side of Los Esesmiles, March 24, 1942, *1126.*

Quercus esesmilensis is a member of the series *Acatenangenses* Trel. In Muller's key to the species of Central American *Quercus* (p. 17), *Q. esesmilensis* would fall between *Q. acatenangensis* Trel. and *Q. conspersa* Benth. It differs from *Q. conspersa* in its minutely winged petioles, veins impressed above and very prominently reticulate beneath, leaf surfaces not yellow-glandular-puberulent beneath, lack of aristae on the apical tips or on the rare teeth, and in its rather large fruit. Although *Q. esesmilensis* is more closely related to the polymorphic *Q. acatenangensis* than to any other, it is readily distinguished by its larger leaves, veins impressed above, reticulum very prominent beneath, larger fruit included only at the base, and its very shallow cups. Immature leaves of *Q. esesmilensis* do not exhibit the prominent reticulum. From superficially similar forms of *Q. Seemanni, Q. esesmilensis* is distinguished by its biennial fruition and its very shallow cups. In its highly developed drip-tip this species reflects the impact of a very humid habitat, a response exhibited by divers species of the genus.

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THE MEXICAN, CENTRAL AMERICAN, AND WEST INDIAN LEPIDIA

C. Leo Hitchcock

When the writer reviewed the genus *Lepidium* in 1936 (Madroño 3: 265–320), there were so many unsolved problems concerning the Mexican and Central American species that it was not considered feasible to try to treat the genus for the whole of North America. While assembling specimens for a study of the South American species, this North American material was borrowed also. It is now felt that the taxonomy of these more southern species is as nearly understood as it ever will be by the use of herbarium methods.

Sources of material borrowed and abbreviations used in citations are as follows: University of California (C), Chicago Natural History [Field] Museum (F), Gray Herbarium (G), private herbarium of B. A. Krukoff, New York Botanical Garden (Kr), Missouri Botanical Garden (MBG), New York Botanical Garden (NY), Stanford University (S), United States National Herbarium (US), University of Washington (W). To the curators of these herbaria I wish to express my sincere appreciation.

Key to Species

1. Plants perennial,[1] sparsely puberulent to glabrous; stamens 6 .... (2)
1a. Plants annual or biennial,[2] often densely pubescent; stamens 2, 4, or 6 .. (3)
2. Styles 0.3–1 mm. long; basal leaves more or less pinnatifid, the cauline 1–5 mm. broad .... 1. *L. montanum*
2a. Styles lacking; all leaves no more than dentate, the cauline as much as 4 cm. broad .... 2. *L. latifolium*
3. Styles 0.2–1 mm. long; silicles sometimes over 5 mm. in length .... (4)
3a. Styles less than 0.2 mm. long; silicles nearly always less than 5 mm. long .... (7)
4. Stamens 6; styles usually at least 0.3 mm. long .... (5)
4a. Stamens 2; styles usually *ca.* 0.2 mm. long .... (6)
5. Silicles 5–6 mm. long; plants without clavate or flattened hairs. 3. *L. sativum*
5a. Silicles 2–3 mm. long; plants with clavate or flattened hairs. 4. *L. Thurberi*
6. Silicles *ca.* 4 mm. long .... 7. *L. Gerloffianum*
6a. Silicles less than 3 mm. long .... 5. *L. sordidum*
7. Plants densely granular-puberulent with clavate or flattened hairs; silicles 1.5–2.2 mm. long .... 5. *L. sordidum*
7a. Plants not puberulent as above; silicles usually over 2.2 mm. long .... (8)
8. Basal leaves deeply pinnatifid, the segments linear; pedicels 2–6 times as broad as thick; silicles ovate to orbicular, glabrous .... 6. *L. nitidum*
8a. Basal leaves not as above, or if so, pedicels not so greatly flattened, or silicles either less rounded or pubescent .... (9)
9. Stamens 6; silicles 5–6 mm. long; cauline leaves mostly pinnatisect. 3. *L. sativum*

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[1] *Lepidium Fremontii* Gray, a shrubby-based perennial with oval silicles 4–7 mm. long, may possibly occur in Mexico, although unreported therefrom.

[2] Also to be expected along the northern boundary of Mexico are *L. flavum* Torr., a yellow-flowered annual with styles 1–1.5 mm. long, and *L. perfoliatum* L., a weedy annual with perfoliate cauline leaves.

9a. Stamens 2 or 4, or if 6 the silicles less than 5 mm. long, or cauline leaves not pinnatisect .... (10)

10. Silicles distinctly wing-tipped for ⅕–⅓ their length, the sinuses *ca.* ⅕ (⅛) length of fruit; fruit not densely pubescent (see also *L. lasiocarpum*). (11)

10a. Silicles not wing-tipped, or if so the wing short, less than ⅕ length of fruit or the sinuses over ⅛ length of fruit, or fruit pubescent on lower surface at least .... (14)

11. Silicles *ca.* 3 mm. long .... 8. *L. Schaffneri*

11a. Silicles 3.5–5 mm. long .... (12)

12. Leaves all pinnatifid to bipinnatifid, rarely but deeply lobed. 9. *L. costaricense*

12a. Leaves of stems not pinnatifid, often semi-entire .... (13)

13. Stamens 6; silicles rather pyriform in outline. 13f. *L. virginicum* var. *tepicense*

13a. Stamens 2; silicles ovate-oblong .... 7. *L. Gerloffianum*

14. Silicles elliptic or nearly so in outline, mostly no more than 3 mm. long; cauline leaves mostly linear and entire .... (15)

14a. Silicles not elliptic in outline, or over 3 mm. long, or cauline leaves pinnatifid .... (16)

15. Racemes compound, mostly 1–3 cm. long; silicles mostly *ca.* 3 mm. long; plants not foetid .... 10. *L. ramosissimum*

15a. Racemes elongate, mostly 3–8 cm. long; silicles mostly 2–2.5 mm. long; plants foetid .... 11. *L. ruderale*

16. Sepals often (though not always) persistent until fruits nearly mature in size; silicles 2–3.25 mm. long, rotund or obovate to broadly elliptic, usually ciliate; petals vestigial or lacking; pedicels flattened, sometimes at least twice as broad as thick; cauline leaves usually laciniate or pinnatifid. 12. *L. oblongum*

16a. Sepals caducous with stamens; silicles variable but often over 3.25 mm. long, mostly glabrous, occasionally pubescent on one or both surfaces; pedicels often more than twice as broad as thick; cauline leaves often lobed or serrate to entire .... (17)

17. Cotyledons accumbent to incumbent; cauline leaves mostly toothed to serrate; pedicels terete to flattened and twice as broad as thick; petals mostly 1 to 3 times as long as sepals; silicles elliptic-rotund to broadly ovate-elliptic, scarcely ever pubescent .... 13. *L. virginicum* and vars.

17a. Cotyledons incumbent; cauline leaves often pinnatisect; pedicels often more than twice as broad as thick; petals seldom as long as sepals; silicles variable in shape, but usually pubescent or at least ciliate .... (18)

18. Pedicels mostly at least twice as broad as thick; silicles usually pubescent, generally broader in upper half than in lower; pubescence of plants often rather coarse and stiff .... 14. *L. lasiocarpum* and vars.

18a. Pedicels not over twice as broad as thick; silicles glabrous or very lightly pubescent, rotund to ovate-elliptic, pubescence of plants fine and soft .... (19)

19. Silicles rotund or nearly so, *ca.* 3 mm. long, margins, at least, with short hairs .... 15. *L. pinnatisectum*

19a. Silicles ovate-elliptic to oval-elliptic, glabrous .... 16. *L. filicaule*

1. Lepidium montanum Nutt. var. alyssoides (Gray) Jones, Zoë 4: 266. 1893; C. L. Hitchc. Madroño 3: 310. 1936.

More or less suffrutescent perennials 2–5 dm. tall, sparsely and minutely puberulent; cauline leaves linear, entire, mostly 1–3 mm. broad; petals showy; stamens usually 6; glands 6, 0.1 mm. long; silicles ovate or elliptic-ovate, 3–4 mm. long, glabrous; styles 0.3–1 mm. long. Pl. 15, fig. 1.

Representative Mexican material. Chihuahua: Samalayuca, *Pringle 712*. Coahuila: near La Ventura, *Johnston 7637*, *Nelson*

3912. Nuevo Leon: Galeana, *Chase 7710.* San Luis Potosi: 2 miles south of Cedral, *Johnston 7581* (G).

This is apparently the only variety of *L. montanum* that extends into Mexico.

2. Lepidium latifolium L. Sp. Pl. 644. 1753; C. L. Hitchc. *op. cit.* 271.

Tall glabrous perennials; basal leaves 3–8 cm. broad; pedicels filiform, terete, several times as long as fruits; stamens 6; glands 6, *ca.* 0.1 mm. long; silicles *ca.* 2 mm. long, sparsely pilose; stigmas sessile. Pl. 15, fig. 7.

Representative Mexican material. Durango: near Durango, *Palmer 168.* Mexico: Valley of Mexico, *Rose* and *Hough 4329, Bourgeau 12.* San Luis Potosi: *Parry* and *Palmer 24.* Puebla: near Puebla, *Arsène 1496.*

An introduced perennial, occasionally established.

3. Lepidium sativum L. Sp. Pl. 644. 1753; C. L. Hitchc. *op. cit.* 270.

Strict erect annuals; leaves all pinnatisect; petals *ca.* 2 mm. long; stamens 6; glands 6, *ca.* 0.1 mm. long; silicles oblong-ovate, 5–6 mm. long, glabrous, margins upturned; styles 0.2–0.3 mm. long; cotyledons dissected, incumbent. Pl. 15, fig. 2.

Only one collection seen. Bermuda: *Brown et al. 2175* (NY).

An occasional escape from cultivation.

4. Lepidium Thurberi Wooton, Bull. Torrey Bot. Club 25: 259. 1898; C. L. Hitchc. *op. cit.* 315.

Large, freely branched annuals 3–6 dm. tall, usually rather grayish with flattened or clavate hairs; leaves mostly pinnatifid to parted; petals very showy, white; stamens 6; glands 6; silicles oval to elliptic in outline, somewhat inflated, 2–3 mm. long, glabrous; styles 0.3–0.6 mm. long. Pl. 15, fig. 3.

Representative Mexican material. Locality uncertain: *Thurber 323.* Sonora: Santa Cruz Valley, *Thurber 695;* Magdalena, *Kennedy 7103.* Chihuahua: *Thurber 695;* 2 miles south of Cruces, *Johnston 7976.*

5. Lepidium sordidum Gray, Pl. Wright. 1: 10. 1852; C. L. Hitchc. *op. cit.* 286.

Densely granular-puberulent annual or biennial with short clavate or flattened hairs; all leaves divided to pinnate; silicles 1.5–2.2 mm. long, glabrous. Pl. 15, fig. 4.

Representative Mexican material. Locality uncertain: *Sessé* and *Mociño 3355.* Chihuahua: near Chihuahua, *Pringle 11, Le Sueur 646.* Coahuila: Jimulco, *Pringle* in 1885. Durango: Durango, *Palmer 136;* Tepehuanes, *Palmer 315.* Sinaloa: Mazatlan, *Rose et al. 13773.* Hidalgo: near Pachuca, *Rose et al. 8809.* Federal District: Mexico City, *Pringle 8488, Rose* and *Hay 5280.*

6. Lepidium nitidum Nutt. ex Torr. & Gray, Fl. N. Am. 1: 116. 1838; C. L. Hitchc. *op. cit.* 291.

Annual, pedicels very greatly flattened, 2 to 6 times as broad as thick; stamens 4 (2 or 6); silicles ovate to orbicular, 3–5 mm. long, margins usually upturned; styles lacking. Pl. 15, fig. 6.

Mexican material seen. Baja California: San Quentin Bay, *Palmer 621, 675;* 40 miles east of Rosario, *Wiggins 4464;* between San Telmo and main road toward San Quentin, *Wiggins 4275;* Ensenada, *Wiggins 4220;* 20 miles north of Ensenada, *Shreve 6811;* south end of Santa Maria plain, *Wiggins 7556.*

7. Lepidium Gerloffianum Vatke ex Thellung, Monog. Lepid. 259. 1906.

Annuals, or more probably, biennials, as much as 60 cm. tall, usually freely branched, the branches ascending, strigillose to hirsute, the hairs mostly 0.5–0.8 mm. long; basal leaves numerous (usually lacking in herbarium specimens), 5–12 cm. long, pinnate into 3–7 pairs of once- or twice-pinnatifid pinnae, long-petiolate, cauline leaves much smaller, mostly 1–3 cm. long, entire, toothed, or less commonly pinnatifid, 1–4 (6) mm. broad; racemes many, 3–10 cm. long, rather closely-flowered; pedicels nearly terete or very slightly flattened, mostly finely pubescent; sepals 1–1.5 mm. long; petals oblanceolate or spatulate, subequal to or longer than sepals; stamens 2; glands 4, *ca.* 0.2 mm. long, oval to lanceolate; silicles *ca.* 4 mm. long, ovate-oblong, not prominently veined, glabrous, or more commonly with few short marginal hairs on lower halves, very conspicuously wing-tipped to below the sinuses, wing-margined to below middle; sinuses narrow, *ca.* $\frac{1}{5}$ length of fruit; styles usually 0.1–0.3 mm. long; seeds *ca.* 1.6 mm. long; cotyledons incumbent. Pl. 16, fig. 17.

Material seen. Mexico: *Berlandier 317* (F, fragment; F and Kr., photo), Mt. Male, near Porvenir, *Matuda 4592,* with considerable doubt (NY); Morelia, Michoacan, *Arsène 6621.* Guatemala: Chichavec, Chimaltenango, *Skutch 131;* Dept. Quezaltenango, *Seler 3164;* near Miramundo, Jalapa, *Steyermark 32830;* Huehuetenango, *Seler 3070, Standley 65584, 81303.*

Lepidium Gerloffianum is most closely related to *L. Schaffneri,* from which it differs chiefly because of the larger fruits. However, as judged from determinations on herbarium labels, it has most frequently been mistaken for *L. virginicum,* from which it differs because of the larger, differently shaped, winged fruits.

8. Lepidium Schaffneri Thell. Monog. Lepid. 261. 1906. *L. monticola* Brandegee, Zoë 5: 232. 1907.

Annuals or biennials, 10–60 cm. tall, their pubescence and basal leaves as in *L. Gerloffianum,* the cauline leaves similar but smaller and entire or somewhat toothed; racemes very numerous, often in the axils of nearly all main leaves, mostly 1–3 (10) cm. long, many-flowered; pedicels subequal to fruits, terete or nearly so, short-pubescent; sepals mostly *ca.* 0.75 mm. long; petals from spatulate and larger than sepals to only linear vestiges $\frac{1}{3}$ their length; stamens 2; glands 4, 0.1–0.2 mm. long, lance-oblong; silicles mostly 3 mm. long or slightly less, ovate-elliptic or ovate-oblong to oblong-obovate, glabrous (rarely with few marginal hairs near base), the upper $\frac{1}{5}$–$\frac{1}{3}$ winged; sinuses $\frac{1}{8}$–$\frac{1}{5}$ length of fruit, narrow to open; styles lacking, seeds 1.25–1.5 mm. long; cotyledons incumbent. Pl. 15, figs. 8–13.

Mexican material seen. Locality uncertain: *Uhde 1052* (photograph, F, Kr); *Consul Woelflin* (NY). Vera Cruz: *Seaton 284.* Puebla: *Pringle 10023, Kenoyer A394, Rose* and *Hay 6075, Purpus 1649,* from Popocatepetl (C, type of *L. monticola,* isotypes F, G, MBG, NY). Federal District: *Orcutt 3700, 3586, Pringle 7260, 7445, Rose* and *Hay 5307* (US), *Lyonnet 1256.* Mexico: *Hinton 4236, 8328, Rose* and *Painter 6461, 6845, 7159, 7966, Kenoyer A391, Hitchcock* and *Stanford 7035, 7218, Schery 74, O. Kuntze 23732, Rose* and *Hay 5712.* Hidalgo: *Pringle 10023, 13461, Rose* and *Painter 6695.* San Luis Potosi: *Palmer 182.*

Lepidium Schaffneri is, in practically all respects, merely a small replica of *L. Gerloffianum;* however, the two species apparently do not intergrade, and it is felt that they both should be maintained. The two can most easily be distinguished from other species with which they show resemblance by their flowers. Even at the beginning of anthesis the ovary is nearly always distinctly cordate in shape, because of the winged tips.

Lepidium monticola was described from very mature, compact, rounded plants which can easily be matched in flower, fruit, and leaf character by many collections of *L. Schaffneri,* as is partially shown by figures 8 to 13 (pl. 15). In habit, however, an exact match for Brandegee's type has not been seen, although there are collections (*Rose* and *Hay 6845, Hinton 8328*) that include specimens enough like it that one is left with little doubt that *L. monticola* must fall to synonymy.

9. **Lepidium costaricense** Thell. Bull. Herb. Boiss. II, 4: 713. 1904; Monog. Lepid. 251. 1906. *L. Humboldtii* Smith, Enum. Pl. Guat. 4: 6. 1895 (not *L. Humboldtii* DC.). *L. bipinnatifidum* Smith in Pittier Fl. Cost. II, 1: 19. 1898 (not of Desv.).

Annuals (or biennials?), 5–40 cm. tall, usually simple at base but much branched above, or branched from base, rather sparsely strigillose below, often more densely pubescent or strigillose above; leaves all divided or pinnatifid, the basal ones as much as 10 cm. long, mostly twice pinnatifid and again lobed or incised, the ultimate divisions mostly 1–2.5 (3) mm. broad, sparsely strigillose on lower sides, cauline leaves more reduced but mostly pinnatifid or deeply incised, occasionally merely with few teeth; racemes 4–10 cm. long, often scarcely exceeding leaves; pedicels subequal to fruits, slightly flattened and very slightly wing-margined, pubescent on upper surfaces, usually glabrous on lower surfaces, ascending to spreading, the racemes as much as 1.5 cm. in diameter; sepals 1–1.5 mm. long, sparsely pubescent on back, caducous; petals entirely lacking or if present only linear vestiges from $\frac{1}{3}$ as long to as long as sepals; stamens 2; glands 4, oblong-lanceolate, 0.1–0.2 mm. long; silicles (3.5) 4–4.4 (5) mm. long, broadly elliptic to obovate, margins usually glabrous but sometimes scabrous-ciliolate, the tips usually alate, the sinuses V-shaped, acute, $\frac{1}{6}$ ($\frac{1}{8}$–$\frac{1}{4}$) length of fruits; styles 0.1–0.2 mm. long, the stigmas nearly sessile; seeds 1.5–2 mm. long; cotyledons incumbent to oblique. Pl. 16, fig. 14.

North American material seen. Costa Rica: *Polakowsky* (photo, F, Kr), *Standley 32323, 32653, 32833, 34526, 35323, 39029, 41293, 42761, Cooper 5707, Tonduz 437, 2129b, Valerio 199, Smith H143, O. Kuntze* in 1874, (NY), *Standley* and *Valerio 49629.* Guatemala: *von Tuerckheim 671.*

The type, collected in Costa Rica (*Hoffmann 139*), was at Berlin, so it is probably destroyed. No other specimen of this collection has been seen, but there can be little doubt concerning the identity of this group of plants. It can be told easily from all other North American species by the rather large, usually obovate wing-tipped silicles which have a very deep sinus. The much-divided leaves also help to distinguish it. Although the silicles of most plants are glabrous, occasionally a specimen is to be seen with ciliolate-margined fruits.

Material from Guatemala is uniform in having much shallower sinuses and less wing to the tip of the fruits. In the case of two of these collections (*Steyermark 34190, Standley 67712*), most leaves have dropped. The plants are very heavy rooted and might well be thought to be perennial. Nevertheless, I believe they are probably the same as the others from Guatemala, and should probably be catalogued as var. *Friedrichsthalii* as Thellung treated them.

9a. L. costaricense Thell. var. Friedrichsthalii Thell. Monog. Lepid. 252. 1906.

Plants annual, often with several stems from base, inflorescence more strigose than in the Costa Rican plants, the silicles less winged and with shallower sinuses. Pl. 16, fig. 16.

Guatemala: *Standley 61479, 67712, Steyermark 34190, 35932, Palm 61.*

The type collection (*Friedrichsthal 1199*) has not been seen but surely the description would indicate its similarity to the plants of the Steyermark collection (*34190*).

10. Lepidium ramosissimum Nelson, Bull. Torrey Bot. Club 26: 124. 1899; C. L. Hitchc. *op. cit.* 276.

Much branched annual or biennial to 5 dm. tall, finely pulverulent or pubescent; basal leaves at least pinnatifid, the cauline mostly linear and entire; racemes numerous, compounded, mostly only 1–3 cm. long; pedicels very slightly flattened, minutely wing-margined; petals minute or wanting; stamens 2; glands 4, *ca.* 0.1 mm. long; silicles elliptic or elliptic-ovate, mostly *ca.* 3 (2.5–3.5) mm. long, glabrous to sparsely pubescent, especially on margins, sinuses $\frac{1}{8}$–$\frac{1}{6}$ length of fruit; styles lacking.

Mexican material seen. Southwest Chihuahua, August to November, 1885, *Palmer* (US).

I am not sure of the identity of this plant, but believe it to be *L. ramosissimum,* rather than either *L. Schaffneri,* which it resembles in the compounded racemes (differing in lack of winged apices to silicles) or *L. ruderale* which it also resembles, but from which it seems to differ chiefly in the compounded racemes and slightly larger fruits. As pointed out before (Hitchc. *loc. cit.*), *L. ruderale* and *L. ramosissimum* are more than superficially alike.

11. Lepidium ruderale L. Sp. Pl. 645. 1753; C. L. Hitchc. *op. cit.* 275.

A foetid puberulent annual or biennial; sepals scarcely 1 mm. long, caducous; petals absent; stamens 2; glands 4, *ca.* 0.1 mm. long; silicles ovate-elliptic to ovate, 2–2.5 (3) mm. long, glabrous, sinuses $\frac{1}{8}$–$\frac{1}{6}$ length of fruit; styles lacking. Pl. 15, fig. 5.

Occasional as a weed in South America and United States; to be expected in Mexico.

12. Lepidium oblongum Small, Fl. Southeastern U. S. 468, 1331. 1903.

Annuals, usually branched from base, prostrate to ascending, as much as 3 dm. tall, hirtellous to villose-hirsute; leaves laciniate to pinnatifid or (the basal ones) bipinnatifid, the segments mostly 1–3 mm. broad; racemes many, 3–9 cm. long; pedicels subequal to silicles, more or less flattened, often twice as broad as thick, wing-margined, pubescent-strigillose on upper surfaces, glabrous (strigillose) on lower surfaces; sepals *ca.* 1 mm. long, pubescent on back, usually persistent until fruits are about half mature, or caducous with stamens; petals usually linear vestiges $\frac{1}{4}$–$\frac{1}{2}$ as long as sepals, or wanting; stamens 2; glands 4, oblong-lanceolate, *ca.* 0.2 mm. long; silicles rotund to oblong-elliptic or broadly elliptic, less commonly more nearly ovate or obovate, 2–3 (3.25) mm. long, very indistinctly veined, glabrous, or much more commonly, margined with few short stiff hairs, not winged, sinuses usually open, $\frac{1}{8}$–$\frac{1}{6}$ length of silicles; styles lacking; cotyledons incumbent. Pl. 16, fig. 15.

As mentioned previously (Hitchc. *op. cit.* 274), there has seemed to be good reason to suppose this species was an introduction from South America, but thorough study of South American material has failed to reveal the presence of these plants there. The lack of auriculate leaves, the presence of marginal hairs on the silicles, and the early shed of the sepals are sufficiently distinctive characters to exclude them from such species as *L. bipinnatifidum* and *L. auriculatum,* the two species they most closely resemble. They are, then, apparently native to and found only in North America.

KEY TO VARIETIES OF LEPIDIUM OBLONGUM

Fruits rotund to obovate in shape; lower surfaces of pedicels often strigillose. 12b. var. *insulare*

Fruits more nearly elliptic or obovate-elliptic in shape; lower surfaces of pedicels glabrous .... 12a. var. *typicum*

12a. L. OBLONGUM Small var. **typicum** nom. nov. *L. oblongum* Small, *loc. cit.;* C. L. Hitchc. *op. cit.* 273, in part; Thell. *op. cit.* 255. *L. reticulatum* Howell *apud* Thell. *op. cit.* 253, in part.

Silicles glabrous or pubescent on margins only, usually broadest at about center, thus more or less elliptic in shape, 2.5–3 mm. long.

Type. Sapulpa, Oklahoma, *Bush 1163.*

Representative material seen, in addition to that previously cited. UNITED STATES: near Salina, Kansas, *Hancin 2097, 2259, 2260* (W); Musquiz Canyon, Brewster County, Texas, *Innes* and *Warnock 473.* The foregoing plants are glabrous-fruited, and possibly should be distinguished, in nomenclature, from the following, which have pubescent-margined silicles: Marfa, Presidio County, Texas, *Hinckley 959.* MEXICO: Coahuila, Saltillo, *Gregg 270* mixed with *L. virginicum* var. *pubescens;* Nuevo Leon, *Palmer 43;* San Luis Potosi, *Schaffner 146, Parry* and *Palmer 21,* in part only (G); Mexico, *Rose* and *Painter 6525, 6791, 7016, Hinton 4979;* Hidalgo, *Fisher 35331, Pringle 7901, 9192, 11920, Rose* and *Painter 6707;* Puebla, *Arsène 2346, Purpus 3487;* Vera Cruz, *Seaton 475.* GUATEMALA: *Steyermark 32117, Standley 61713, Kellerman 4538.*

I have seen none of the material Thellung (*loc. cit.*) cited as *L. reticulatum* var. *Karwinskyanum,* but feel confident that it would be included here.

12b. L. OBLONGUM Small var. **insulare** var. nov. *L. reticulatum* Howell *apud* Thell. *op. cit.* 253, in part. *L. oblongum* Small *apud* Hitchc. *op. cit.* 273, in part.

Siliculis 2–2.5 mm. longis, rotundibus vel ovatis, marginibus ciliatis; pedicellis saepe strigillosis.

Silicles mostly 2–2.5 mm. long, rotund to obovate in outline, margins pubescent; pedicels often strigillose on lower surfaces. Pl. 16, fig. 15.

Type. Guadalupe Island, Baja California, 1875, *Palmer 7* (NY; isotypes, MBG, G).

Material seen. Baja California, Mexico: Guadalupe Island, *Palmer 897, Rose 16006, Drent,* mixed with *L. lasiocarpum* (C), *Greene* in 1885 (C, S in part), *Brown 65;* San Benito Island, *Anthony 275, Pond 2, Rose 16058, 16077, Brandegee* in 1897; Cedros Island, *Palmer 709, Rose 16127;* Natividad Island, *Brandegee* in 1897. United States: Santa Cruz Island, California, *Brandegee* in April and June, 1888; Del Mar, California, *Brandegee* in 1894.

Most material from the mainland of California and of Lower California has larger silicles than do the insular plants, and is otherwise somewhat intermediate in character with the typical variety (pl. 16, fig. 15b); besides material of such a nature cited previously, the following Mexican collections can be included. Sonora: 34 miles southwest of Sasabe, *Keck 3990.* Baja California: Ensenada, *Wiggins 4221;* 23.5 miles south of Hamilton Ranch, *Wiggins 4299* (G, S in part, US).

Although this variety of the species, especially, approaches *L. lasiocarpum* in nature, in nearly all cases it can be recognized by the more divided leaves, smaller pubescent-margined fruits, and less flattened, more wing-margined pedicels. That the two plants are sufficiently distinct to merit their maintenance as separate species, there seems little doubt.

13. Lepidium virginicum L. Sp. Pl. 645. 1753.

Annuals, winter annuals or biennials, to 6 (7) dm. tall, rather freely branched, especially above, the branches sparsely pubescent to densely strigillose or hirsute; basal leaves (usually lacking in fruiting specimens) mostly 5–15 cm. long, 1–5 cm. broad, usually pinnatifid into several remote pairs of lobed to incised pinnae, sparsely to densely pubescent or hirsute, cauline leaves smaller, pinnatifid, or more commonly somewhat lobed, toothed, or serrate; racemes numerous, 3–20 (25) cm. long; pedicels slender, (1) 1½ to 3 times as long as fruits, spreading, terete or more or less flattened, sometimes as much as twice as broad as thick, very finely pubescent to hirsutulous, usually glabrous on lower surfaces, sometimes pedicels and rest of inflorescence entirely glabrous; sepals *ca.* 1 mm. long, glabrous or sparsely hairy on back, caducous, or rarely persistent until fruits considerably enlarged; petals usually more or less spatulate, mostly 1 to 3 times as long as sepals, less commonly linear and shorter than sepals, rarely wanting; stamens 2 (4 or 6 very rarely); glands 4, scarcely 0.1 (0.2) mm. long, somewhat broader; silicles 2.5–4 mm. long, elliptic-rotund or semi-orbicular to broadly ovate-elliptic, the lower half usually at least as broad as the upper half, indistinctly veined, very slightly winged, glabrous or very rarely with some pubescence, sinuses scarcely $\frac{1}{10}$ length of fruits, open; styles barely evident, *ca.* 0.1 mm. long; seeds *ca.* 1.5 mm. long; cotyledons accumbent or oblique to incumbent. Pl. 16, figs. 19–21.

Lepidium virginicum is fairly easily distinguished from most other species, especially in Mexico and in South America, where *L. densiflorum* apparently does not occur. It would be more consistent with my present views, perhaps, to recognize some of the following entities as subspecies rather than varieties, but varietal categories are being used since this procedure requires less nomenclatural reshuffling.

KEY TO VARIETIES OF LEPIDIUM VIRGINICUM

1. Pedicels terete or nearly so, very sparsely short-pubescent, cotyledons accumbent .... 13a. var. *typicum*
1a. Pedicels somewhat flattened, glabrous or rather copiously pubescent, cotyledons oblique to incumbent .... (2)
2. Inflorescence and upper part of stem glabrous (not found in Mexico). var. *medium*
2a. Inflorescence and upper portion of stem pubescent .... (3)
3. Cauline leaves parted or lobed into narrow segments 1–2 mm. broad, plants mostly only 1–2 dm. tall .... 13e. var. *Robinsonii*
3a. Cauline leaves various, but if divided the segments usually over 2 mm. broad, or plants mostly over 2 dm. tall .... (4)
4. Basal leaves rather thick, fleshy, forming very heavy rosettes of 20–80 leaves, pubescence dense, crisped; plants usually with several stems (not in Mexican flora) .... var. *Menziesii*
4a. Basal leaves not thick and fleshy, rosettes, if any, mostly with no more than 30 leaves; pubescence variable, but usually not markedly crisped; plants mostly single-stemmed .... (5)
5. Silicles more nearly oval-elliptic than oval or rotund; petals usually mere vestiges or wanting; pedicels distinctly flattened and very narrowly wing-margined .... 13b. var. *centrali-americanum*
5a. Silicles usually oval to rotund, petals usually nearly or quite as long as sepals, pedicels slightly flattened to terete .... (6)
6. Plant grayish pubescent with short stiff hairs, the stems almost powdery with hairs 2–3 (5) times as long as thick; fruits less than 3 (mostly *ca.* 2.5) mm. long .... 13c. var. *durangense*
6a. Plant not cinereous as above, the hairs of stems usually over 3 times as long as thick; fruits usually over 2.75 mm. long .... (7)
7. Cauline leaves narrowly lobed to parted; plants 1–2 dm. tall. 13e. var. *Robinsonii*
7a. Cauline leaves mostly simple, entire to incised; plants mostly 3–6 dm. tall .... (8)
8. Stamens usually 2; silicles oval or nearly so, margins usually not ciliate. 13d. var. *pubescens*
8a. Stamens 6; silicles pyriform, the apices winged, margins usually ciliate. 13f. var. *tepicense*

13a. L. VIRGINICUM L. VAR. TYPICUM C. L. Hitchc. *op. cit.* 282.

Characterized by the sparse, short pubescence, terete pedicels, and accumbent cotyledons. Pl. 16, fig. 20.

Representative material from the West Indian Islands. CUBA: *Wright 2494, Shafer 151, 1130, 1451, 1815, 4357.* JAMAICA: *Harris 6914, Orcutt 3245, Maxon 971.* HAITI: *Leonard 3633, 7985, 8166.* DOMINICAN REPUBLIC: *Abbott 658, Valeur 137, Rose et al. 4218.* PUERTO RICO: *Britton* and *Shafer 2143, Shafer 2443, Urban 6678.* ST. CROIX: *Ricksecker 312, 357.*

The following Mexican collections are more or less intermediate with var. *pubescens* but are more properly placed under var. *typicum,* since they have accumbent cotyledons. SINALOA: San Ignacio, *Ortega 310;* Elota, *Ortega 5441;* Culiacan, *Rose et al. 14862;* Villa Union, *Rose et al. 13943.* NAYARIT: Tepic, *Palmer 2029, Rose et al. 14401.* TAMAULIPAS: San Jose, *Le Sueur 156,* plant glabrous except for few hairs on leaves, yet cotyledons accumbent. MICHOACAN: Coalcoman, *Hinton 12978.*

Good reason can be advanced for the maintenance of the typical phase of the plant as a species, or at the very least a subspecies, distinct from its more western relatives in North America. In general it can be recognized very easily by its terete pedicels. However, since much of the material from Tepic and vicinity is intermediate in character with the variety *pubescens,* the species is being treated as one large complex.

13b. L. VIRGINICUM L. var. **centrali-americanum** (Thell.) comb. nov. *L. virginicum* subsp. *centrali-americanum* Thell. *op. cit.* 231.

Plants 2–6 dm. tall; pedicels not quite twice as broad as thick, glabrous on lower surfaces, narrowly wing-margined, scarcely if at all longer than silicles; petals linear and no longer than fruits to mere vestiges or lacking entirely; silicles mostly conspicuously longer than broad and tending to be elliptic in outline.

Representative material. ISLAND OF COZUMEL: *Millspaugh 1567.* YUCATAN: *Gaumer 456, 1776, 1777, 24001, 24205, Lundell 820, Seler 3954, Valdez 14.* BRITISH HONDURAS: *Lundell 358, 4741, Bartlett 12913.* GUATEMALA: *Bartlett 12687, von Tuerckheim 671, 1676, 11653, Standley 61373, 66422, 69831, 77823, 83252.* EL SALVADOR: *Renson 155, Standley 22827, Calderon 452,* intermediate with var. *pubescens.* COSTA RICA: *Orozco 91, Solis 343.* NICARAGUA: *Artemio 76, Maxon et al. 7390* (US), *Chaves 318.*

The following collections are placed here only because of their small petals, otherwise they are more similar to var. *pubescens.* EL SALVADOR: *Standley 19640, 21156, 22694.* MEXICO: Morelia, *Arsène 3346.*

If varieties *medium* and *pubescens* were separated from *L. virginicum* var. *typicum* as distinct species, then this entity would need to be included under *L. medium* unless it, too, were recognized as a distinct species. It intergrades with var. *pubescens,* however, and in some localities, especially in Guatemala, the apparent hybrids between the two are more numerous than either of the

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EXPLANATION OF THE FIGURES. PLATE 15.

PLATE 15. FLOWERS AND FRUITS OF LEPIDIUM. Fig. 1, *L. montanum* var. *alyssoides.* Fig. 2, *L. sativum.* Fig. 3, *L. Thurberi.* Fig. 4, *L. sordidum.* Fig. 5, *L. ruderale.* Fig. 6, *L. nitidum.* Fig. 7, *L. latifolium.* Figs. 8–13, *L. Schaffneri:* fig. 8, from *Hitchcock* and *Stanford 7035;* fig. 9, *Hinton 8328;* fig. 10, *Consul Woelflin;* fig. 11, *Rose* and *Painter 6845;* fig. 12, from type of *L. monticola, Purpus 1649;* fig. 13, *Fischer, July 25, 1924.* All figures × 6⅔. In nearly all cases fig. *a* represents a mature silicle, fig. *b,* a flower at late anthesis.

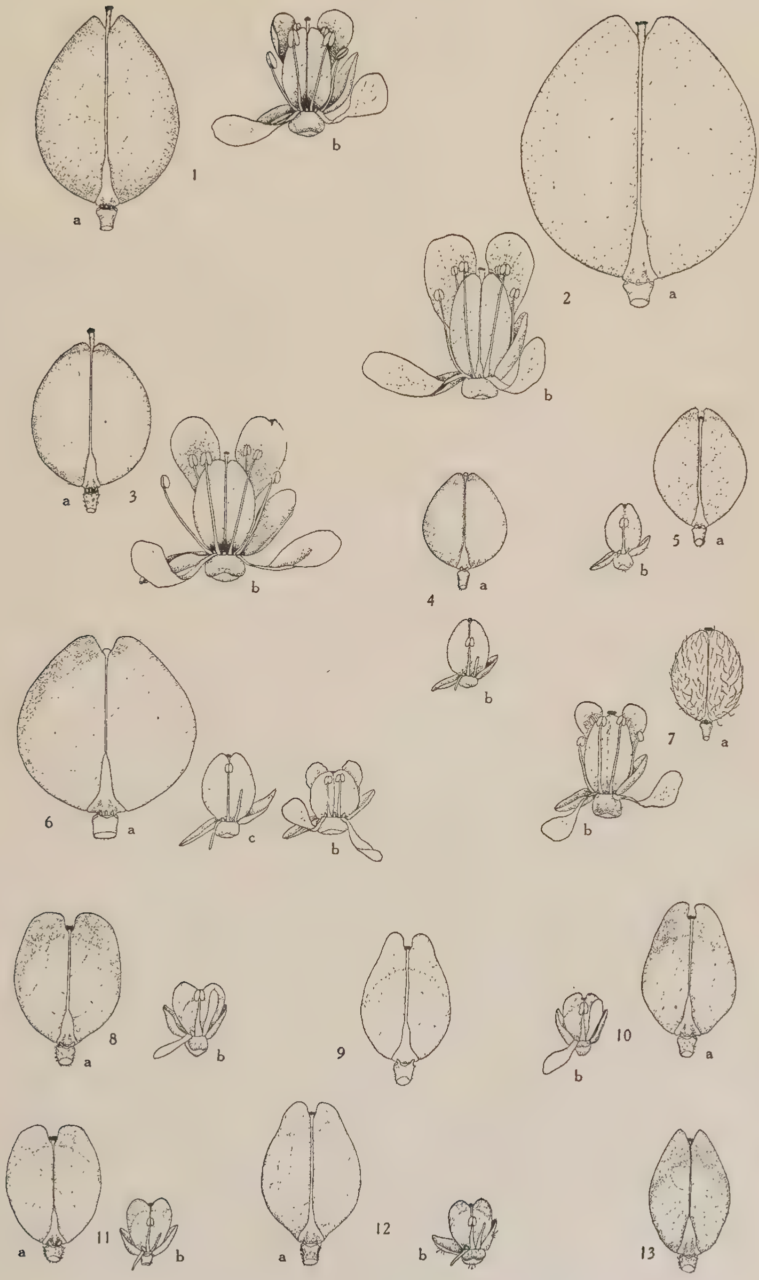

Plate 15. Flowers and Fruits of Lepidium.

two varieties. Examples of such intermediate forms are: GUATEMALA: *von Tuerckheim 8375, Muenscher 12514, Steyermark 35053, Standley 62828, Johnston 240, Kellerman 6732.*

Since these three collections are practically apetalous, they appear to belong here, but more properly belong with var. *pubescens.* MEXICO: El Rosario, D. F., *MacDaniels 644;* La Cruz, Sinaloa, *Ortéga 5441;* Cordoba, Vera Cruz, *Orcutt 3133.*

The following plants, chiefly from the region of Tampico, Mexico, are puzzling. In most particulars they resemble *L. virginicum* var. *centrali-americanum,* yet the fruits are rounded more like those of var. *pubescens.* Since they have flattened pedicels and vestigial petals, they are also suggestive of *L. lasiocarpum* var. *orbiculare.* They serve to illustrate, further, the complete transition between *L. lasiocarpum* and *L. virginicum* as the latter is represented by vars. *pubescens* and *centrali-americanum.* MEXICO: Vera Cruz, *Orcutt 2864, 3133;* Orizaba, *Batteri 309;* Tampico, *Palmer 76.*

13c. L. VIRGINICUM L. var. **durangense** var. nov. Planta plus minusve incana; pilis cauliorum brevissibus, 0.1–0.2 mm. longis; foliis caulinis 1–3 (5) mm. latis; sepalis petalisque *ca.* 0.5 mm. longis; siliculis *ca.* 2.5 mm. longis.

Plants grayish with dense pubescence, the pubescence of stems and inflorescence very short (0.1–0.2 mm. long) and thick; cauline leaves mostly 1–3 (5) mm. broad; sepals and petals *ca.* 0.5 mm. long; silicles mostly *ca.* 2.5 mm. long.

Type. Tepehuanes, Durango, Mexico, June 4 to 25, 1906, *Ed. Palmer 320* (G; isotypes, C, F, MBG, NY, US).

Other material seen. DURANGO: Durango, *Palmer 167* (C, F, G, MBG, NY); Tepehuanes, *Palmer 321* (G, NY, US); Otinapa, *Palmer 413* (C, F, G, NY, US), *414* (F, G, MBG, NY, US).

The variety is well marked and easily recognized, but is approached in character by the following Mexican collections, all of which should more properly be placed in *L. virginicum* var. *pubescens.* COAHUILA: Saltillo, *Palmer 196.* DURANGO: *Palmer 19;* San Ramón, *Palmer 56.*

13d. L. VIRGINICUM var. PUBESCENS (Greene) C. L. Hitchc. *op. cit.* 283. *L. lasiocarpum* Nutt. var. *tenuipes* Watson, Proc. Am. Acad. 17: 322. 1882 (*nomen dubium*).

Plants usually 2–7 dm. tall, the cauline leaves 1–20 mm. broad, usually sparsely hairy; pedicels flattened to nearly terete, but less slender than in var. *typicum;* sepals *ca.* 1 mm. long; petals usually present, mostly subequal to, or longer than sepals; silicles (2.5) 3–4 mm. long, oval to nearly rotund. Pl. 16, fig. 21.

Representative material. MEXICO: Baja California, La Encantada, *Wiggins* and *Demaree 4876, 4924, Brandegee* in 1893; Chihuahua, near Chihuahua, *Palmer 34;* Coahuila, Parras, *Palmer 41,* type collection of *L. lasiocarpum* var. *tenuipes* (US, 2 sheets), Saltillo, *Gregg 261;* Tamaulipas, Victoria, *Palmer 560;* Sinaloa, Puerto a Tamiapa, *Gentry 5847;* Zacatecas, near Plateado, *Rose 2779;* San Luis Potosi, *Schaffner 553, 145, Palmer 606, Parry* and *Palmer 21* in part, *22, 23;* Vera Cruz, Cordoba, *Orcutt 3133;* Orizaba, Boca del Monte, *Nelson 205,* in part; Hidalgo, near El Salta, *Rose* and *Painter 7092;* Guanajuato, *Dugès 164a, 164b;* Michoacan, 4 miles west of Hidalgo, *Hitchcock* and *Stanford 7187;* Federal District, Mexico City, *Pringle 8284;* Mexico, Toluca, *Frye* and *Frye 2620,* Rio Hondo Canyon, *Pringle 7724;* Puebla, Tehuacan, *Rose* and *Hay 5921,* intermediate to *L. lasiocarpum;* Oaxaca, Valle de Oaxaca, *Conzatti 1734* (US). GUATEMALA: Dept. Huehuetenango, *Seler 3070, Standley 65736, 65763.* COSTA RICA: *Standley 33404.* EL SALVADOR: *Standley 19640, 21156.*

This is by far the largest of the varieties of *L. virginicum* except for the var. *typicum* and it is surely the most variable of the different phases, exhibiting all the tendencies which characterize the other varieties and almost without exception, merging with them.

Although the pedicels are usually slightly flattened, many plants, especially those from Chihuahua, Mexico, have pedicels that are terete and scarcely any thicker than those of var. *typicum.* In such cases, the presence of incumbent cotyledons indicates that the specimens belong here. A few such examples follow. MEXICO: Chihuahua and vicinity, *Le Sueur 1327, Palmer 34, White 2371;* El Cima, *Le Sueur 641;* base of Sierra Madre, *Pringle 1528;* Guerrero, *Mexia 2536;* Tepic, *Rose 2125, Palmer 2029;* Guadalajara, Jalisco, *Abrams 12892.* GUATEMALA: *Heyde 569.* On the other hand, a few specimens have pedicels as greatly flattened as those of some plants of *L. lasiocarpum.* Such individuals could with equal reason be considered to be either *L. virginicum* or glabrous-fruited specimens of *L. lasiocarpum.* That they are hybrids seems not unlikely.

Watson's *L. lasiocarpum* var. *tenuipes* included plants of the nature mentioned above. Most of the material Watson cited (e.g., *Schaffner 145, Parry* and *Palmer 21, 22*) actually belongs here, and most of the type collection, and probably the type itself, must be included also. Watson pointed out the intergradation between var. *tenuipes* and *lasiocarpum* proper, citing *Palmer 38* and *42* and *Berlandier 2488* as such examples. These latter specimens are being assigned to *L. lasiocarpum* by the writer, under the var. *orbiculare.*

In nearly all instances, the fruits of *virginicum* are glabrous. An occasional plant with hairy fruits is to be found as is shown by such sporadic collections as: 15 miles north-northwest of Rosarito, Baja California, *Wiggins 10,005A* (S); Luna, Catron County, New Mexico, *Hitchcock et al. 4479* (W), and Charleston Mountains, Nevada, *Clokey 8367* (W).

A collection from Saltillo, Mexico (*Palmer 196,* G, US), is abnormal and perhaps diseased; the pedicels of the plants are greatly flattened and bear minute bracteoles lateral to their winged margins.

A collection from 15 km. west of Concepcion del Oro, Coahuila, Mexico, (*Stanford et al. 256*) is possibly significant enough to merit nomenclatural status. The plants have small fruits, like those of var. *durangense,* but lack the pubescence of that variety. They are apetalous and have linear glands *ca.* 0.4 mm. long, or nearly twice as long as those of any other specimen of *L. virginicum* seen.

13e. L. VIRGINICUM var. ROBINSONII (Thell.) C. L. Hitchc. *op. cit.* 285.

Plants usually less than 2 dm. tall; cauline leaves mostly divided into various segments.

Mexican material seen. BAJA CALIFORNIA: Vallecitos, April 5, 1886, *Orcutt* (F, MBG, NY). This peculiar phase of the species is more commonly found in southern California. Whether or not it is other than a depauperate form of var. *pubescens* that occasionally appears I cannot be sure.

13f. L. VIRGINICUM L. var. **tepicense** var. nov. Planta pulverulento-pubescenta; pedicellis aliquid compressis; petalis spathulatis, sepaliorum longitudinis aequalibus vel longioribus; staminibus 2; glandulis 0.1–0.2 mm. longis; siliculis 3–4 mm. longis, pyriformis, alatis, marginibus sparse breve ciliatis; cotyledonibus obliquis vel incumbentibus.

Plant finely puberulent-pubescent; pedicels flattened slightly, finely pubescent; petals spatulate, slightly longer than sepals; stamens 6; glands 0.1–0.2 mm. long; silicles 3–4 mm. long, pyriform in outline, apices winged, margins sparsely short ciliate; cotyledons oblique to incumbent. Pl. 16, fig. 19.

Type. Tepic, Nayarit, Mexico, February 16, 1927, *Jones 22840* (C; isotype, F).

Because of the peculiarly shaped, ciliolate fruit, and presence of six stamens, this plant might be thought to merit specific status. There is enough similarity to var. *pubescens,* however, to convince me it merits no more than varietal status.

14. LEPIDIUM LASIOCARPUM Nutt. ex Torr. & Gray, Fl. N. Am. 1: 115. 1838.

Annual, prostrate to erect and frequently as much as 30 cm. tall, usually branched from base, but sometimes branched above only, strigillose to densely hirsutulose-hispidulose, the hairs 0.2–1.2 mm. long; basal leaves 2–15 cm. long, mostly lyrately pinnatifid to bipinnatifid, the ultimate divisions 1–15 mm. broad, cauline leaves similar but sometimes subentire, as much as 15 mm. broad; racemes 2-15 cm. long; pedicels from subequal to fruits to twice as long, from moderately to greatly flattened (2 to 5 times as broad as thick), usually pubescent on both surfaces, or glabrous on lower surfaces; sepals 1–1.5 mm. long, usually pubescent to hirsutulous on back; petals usually linear vestiges less than half as long as sepals, occasionally as long as sepals, not uncommonly lacking entirely; stamens 2 (4 or 6); glands 4 (6), 0.1–0.2 (0.5) mm. long, lanceolate; silicles (2.5) 3–3.5 (4) mm. long, from oval to oblong-elliptic or oblong-obovate, usually hispidulous on both surfaces but not uncommonly hispidulous on margins only, infrequently glabrous, sinuses ($\frac{1}{10}$) $\frac{1}{8}$–$\frac{1}{6}$ ($\frac{1}{5}$) length of fruit, narrow to open, the apices of fruits usually winged; styles lacking; cotyledons incumbent. Pl. 16, figs. 22–23.

In general, *L. lasiocarpum* can be recognized from our other species because of the pubescent fruits, stiff pubescence, and flattened pedicels. However, the species is apparently in an extremely unstable condition, and great variation is to be found in every attribute which has been thought to characterize it. Especially is this true in Mexico where it simulates or actually merges with such apparently different species as *virginicum* (var. *pubescens*), *densiflorum, dictyotum,* and *oblongum,* the evidence indicating that this is due in part, at least, to hybridization. The following key represents an attempt to separate a few of the more conspicuous variations which are known to occur in Mexico, even though complete transition appears to exist between all the groups considered.

Key to Varieties of Lepidium lasiocarpum

1. Hairs more or less pustular-based, stiff; plants grayish-hispidulous; pedicels at least 3 times as broad as thick; glands 0.2–0.5 mm. long. 14f. var. *Wrightii*

1a. Hairs not pustular-based; if plants grayish pubescent, pedicels usually not 3 times as broad as thick; glands usually not over 0.2 mm. long .... (2)

2. Pedicels 3 to 5 times as broad as thick; leaves pinnatisect into divisions 1–2 (3) mm. broad .... 14g. var. *Palmeri*

2a. Pedicels less than 3 times as broad as thick, or leaves not pinnatisect as above .... (3)

3. Lower surfaces of pedicels usually glabrous, mostly at least twice as broad as thick, plants usually branched from base, the hairs of stems mostly not over 0.5 mm. long .... (4)

3a. Lower surfaces of pedicels usually pubescent, or not twice as broad as thick, or plants simple at base, or hairs of stems over 0.5 mm. long .... (5)

4. Cauline leaves, in part, 5–20 mm. broad, lobed or toothed; racemes 5–20 cm. long, loosely flowered .... 14c. var. *latifolium*

4a. Cauline leaves chiefly less than 5 mm. broad, if broader, usually pinnatisect; racemes mostly less than 10 cm. long .... 14b. var. *georginum*

5. Plants prostrate, less than 5 cm. tall; leaves pinnatisect into divisions usually less than 2 mm. broad; racemes 1–5 cm. long, densely crowded with fruits, silicles less than 3 mm. long .... 14d. var. *rosulatum*

5a. Plants usually more erect; leaves usually with divisions over 2 mm. broad; racemes to 12 cm. in length; silicles as much as 4 mm. long .... (6)

6. Pedicels scarcely twice as broad as thick, usually glabrous on lower surfaces; plants mostly simple below .... 14e. var. *orbiculare*

6a. Pedicels usually at least twice as broad as thick, mostly pubescent on lower surfaces; plants commonly prostrate or branched from base. 14a. var. *typicum*

14a. L. LASIOCARPUM var. TYPICUM C. L. Hitchc. *op. cit.* 289, exclusive of *L. Palmeri* and *L. lasiocarpum* subsp. *Palmeri.*

Plants pubescent to hispidulous, the hairs not pustular-based; leaves various, but usually with ultimate divisions less than 5 mm. broad; pedicels usually much flattened and pubescent on both surfaces; silicles mostly over 3 mm. long.

Representative Mexican material. COAHUILA: Saltillo, *Palmer* $196\frac{1}{2}$, approaching var. *orbiculare, Gregg 364.* SINALOA: Mazatlan, *Rose et al. 13866.* SONORA: 23.6 miles southwest of Sonoyta, *Wiggins 8347A;* San Bernardo, *Gentry 1363;* near Alamos; *Rose et al. 12952.* BAJA CALIFORNIA: Santa Aqueda, *Palmer 234,* intermediate with var. *latifolium* (G).

Although the type of the species was collected in coastal California, plants similar enough to the type to be inseparable from it occur as far east as Colorado and to the south as far as Sonora and Baja California. The several entities here recognized as varieties intergrade with the typical variety.

As an illustration of the intergradation between *L. lasiocarpum* and *L. virginicum* var. *pubescens,* a collection from Tehuacan, Puebla (*Rose* and *Hay 5921,* NY, US), will suffice. These plants could be placed in either of the two species by pubescence, leaf size and shape, and habit, although they are perhaps more like *L. virginicum* than *L. lasiocarpum.* The pedicels are flattened more than usual for *L. virginicum* var. *pubescens.* The fruits are the ovate fruits of *L. virginicum,* but have a few marginal hairs, a *lasiocarpum*-character, as is the lack of petals. Since the collection would be out of range for *L. lasiocarpum,* I am calling it *L. virginicum* var. *pubescens.*

14b. L. LASIOCARPUM var. GEORGINUM (Rydberg) C. L. Hitchc. *op. cit.* 291.

Plants scarcely hispid, the pubescence shorter and softer than in var. *typicum,* sometimes whole plant subglabrous; cauline leaves entire to toothed, usually less than 5 mm. broad; pedicels glabrous on lower surfaces at least; silicles mostly 3–3.5 mm. long, usually glabrous on lower surfaces but hairy on upper, or with marginal hairs only, or entirely glabrous. Pl. 16, fig. 22.

Representative material. MEXICO: 7 miles northeast of Cajeme, Sonora, *Wiggins 6381;* 3 miles south of Los Bolinas, Sonora,

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EXPLANATION OF THE FIGURES. PLATE 16.

PLATE 16. FLOWERS AND FRUITS OF LEPIDIUM. Fig. 14, *L. costaricense.* Fig. 15, *L. oblongum: a* var. *typicum, b* intermediate *typicum-insulare, c* and *d* var. *insulare.* Fig. 16, *L. costaricense* var. *Friedrichsthalii.* Fig. 17, *L. Gerloffianum.* Fig. 18, *L. pinnatisectum.* Fig. 19, *L. virginicum* var. *tepicense.* Fig. 20, *L. virginicum* var. *typicum.* Fig. 21, *L. virginicum* var. *pubescens.* Fig. 22, *L. lasiocarpum* var. *georginum.* Fig. 23, *L. lasiocarpum* var. *orbiculare.* Fig. 24, *L. filicaule.* All figures × $6\frac{2}{3}$. In nearly all cases fig. *a* represents a mature silicle, fig. *b,* a flower at late anthesis.

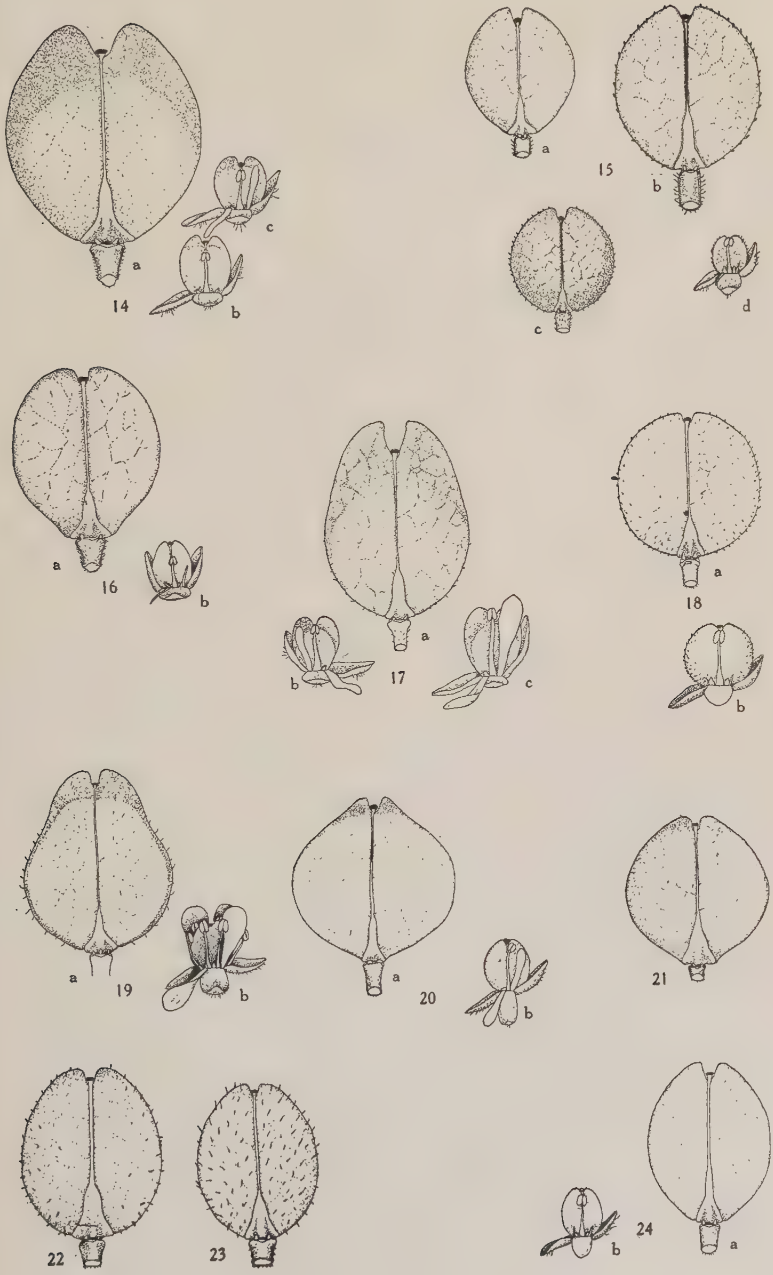

Plate 16. Flowers and Fruits of Lepidium.

Keck 3990. United States: *Hitchcock 2996, 3048, Clokey 7937, 7938, Yates 6426,* the latter from Riverside County, California. Material intermediate to var. *typicum:* 10 miles northwest of Kingston, Riverside County, California, *Hitchcock 6156* (W); Ensenada, Baja California, *Purer 7174* (MBG).

This weakly pubescent form of the species was described from a plant collected in Utah, but is to be found south of the border in Baja California as well as in Sonora. It is an ill-marked variant that simulates the variety *orbiculare* (including *austrinum* and "*tenuipes*") and merges with the equally glabrate but broader leaved var. *latifolium* of Lower California. Occasional plants (e.g., *Wiggins 6381, Yates 6426*) have glabrous fruits. Such specimens might easily be mistaken for *L. virginicum* var. *pubescens.* If the young ovaries are examined, however, tiny hairs can be detected, thus substantiating their inclusion under *L. lasiocarpum.* They would key out to var. *georginum,* but it is felt that they are more or less depauperate and that they more properly belong with var. *latifolium.* The following specimens are representative: 24.3 miles south of Rosario, Baja California, *Wiggins 5281;* Cucopa Mountains, Baja California, *MacDougal 201;* Natividad Island, *Brandegee* in 1897 (C).

14c. L. lasiocarpum var. **latifolium** var. nov. Planta sparse pubescente, pilis rare plusquam 0.5 mm. longis; foliis caulinis saepe leviter lobatis, 5–20 mm. latis; racemis saepe 10–20 cm. longis; pedicellis patentibus, compressissimis, ca. 3-plo latioribus quam crassioribus, pubescentibus, vel superficie inferiore glabra, 1–2 longitudinis siliculorum; siliculis ca. 3.5 mm. longis, superficiis inferioribus et superioribus pubescentibus vel glabris sed marginibus pubescentibus.

Plants sparsely pubescent, the hairs seldom over 0.5 mm. long; cauline leaves usually shallowly lobed, 5–20 mm. broad; racemes mostly 10–20 cm. long, loosely-flowered; pedicels spreading, mostly about 3 times as broad as thick, pubescent, or glabrous on lower surfaces, as much as twice as long as silicles; fruits *ca.* 3.5 mm. long, pubescent on both surfaces or on margins only.

Type. Todos Santos, Baja California, Mexico, February 11, 1929, *M. E. Jones 24097* (MBG no. 969259; isotypes, C, F, MBG, NY).

Other material seen. Baja California: near Calmalli, *Haines* and *Stewart* in 1935, *Shreve 6966, Wiggins 7773;* Mulege, *Johnston 3700;* Santa Agueda, *Palmer 234;* 22 miles south of Pozo Aleman, *Wiggins 7854;* 7 miles south of Sasabe, *Wiggins 8186;* San Gregorio, *Brandegee* in 1889 (C); Laguna Maguata, *Epling et al.* in 1933; 23.5 miles south of Hamilton Ranch, *Wiggins 4299* (C, NY, S in part, but not G or US); 3½ miles north of Punta Prieta, *Wiggins 7634;* Pescadero, *Brandegee* in 1893; Guadalupe Island, *Palmer*

8, 841, 851, Howell 8275, Brandegee in 1897, *Mason 1516;* Clarion Island, *Anthony 405;* Magdalena Island, *Brandegee* in 1889.

These plants can be recognized by their habit and broad leaves although they are approached in leaf character by some specimens such as: Death Valley, Inyo County, California, *Hitchcock 6192* (W), a plant that more properly belongs under var. *georginum,* and by the following collections all of which must be considered intermediate to var. *typicum:* southern Utah, *Hitchcock 2996* (G), *Jones* in 1880 (NY); 10 miles west of Wenden, Arizona, *Wiggins 8472* (S); Alamos, Sonora, Mexico, *Rose et al. 12952* (NY), San Bernardo, Sonora, Mexico, *Gentry 1363* (F).

A few collections seen have pinnatifid cauline leaves, and suggest *L. oblongum* var. *insulare.* Plants of such a nature include: 3½ miles north of Punta Prieta, *Wiggins 7632,* and Santa Catarina Landing, *Wiggins 4431.* Of the two, the latter is more truly like *L. lasiocarpum,* the former more like *L. oblongum.* Such intermediates are believed to be hybrid in origin.

14d. L. LASIOCARPUM var. **rosulatum** var. nov. Planta prostrata, strigillosa vel hirsutulosa; caulibus 3–10 cm. longis; foliis 1–2 cm. longis, divisis vel 1–2-plo pinnatifidis, pinnulis 1–2 mm. latis; racemis multis, 1–5 cm. longis, multifloris; pedicellis siliculis subaequilongis, leviter compressis, ca. 2-plo latioribus quam crassioribus, superficie inferiore saepe glabra; siliculis 2–3 mm. longis, saepe oblongo-obovatis, hirsutulosis, marginibus pubescentibus.

Plants prostrate, the branches scarcely 10 cm. long, whole plant strigillose to hirsutulose; leaves scarcely over 2 cm. long, all divided or once or twice pinnatifid into narrow divisions scarcely 2 mm. wide; racemes many, 1–5 cm. long, very densely congested, nearly hiding the leaves, pedicels about equal to silicles, flattened slightly, about twice as broad as thick, usually glabrous on lower surfaces; silicles scarcely 3 mm. long, mostly oblong-obovate, from hirsutulous to pubescent-margined or entirely glabrous, scarcely winged, sinuses *ca.* ⅛ length of silicles, U-shaped.

Type. Rocky hillside 20 miles south of Nogales, Sonora, Mexico, April 5, 1939, *T. C.* and *E. M. Frye 2265* (W no. 65660; isotypes, G, NY, S).

Other material seen. MEXICO: 25 miles south of Nogales, Sonora, *Abrams 13138* (S); 3 miles west of Petiquito, Sonora, *Wiggins 8227* (S, US); 9 miles from Imuris in canyon of Magdalena River, *Ferris 8797* (S). The following two collections, both from Arizona, are intermediate in character between vars. *rosulatum* and *typicum:* 6 miles west of Mohawk, Yuma County, *Wiggins 8649* (US); Santa Rita Mountains, *Nelson* and *Nelson 1381* (G).

The variety *rosulatum* is characterized by the small fruits, densely crowded racemes, slightly flattened pedicels, and small pinnatifid leaves. It is somewhat suggestive of var. *orbiculare,* but differs because of the crowded racemes and small compound leaves. There is considerable variation in the amount of pubescence on the silicles, some collections, such as *Wiggins 8227,* include plants with silicles from hirsutulous all over to pubescent on the margins only.

The varietal name is taken from a sheet distributed by Dr. and Mrs. Aven Nelson, which was annotated as a new form.

14e. L. LASIOCARPUM var. **orbiculare** (Thell.) comb. nov. *L. austrinum* Small, Fl. Southeastern U. S. 468, 1331. 1903; Thellung, *op. cit.* 239; Hitchcock, *op. cit.* 287. *L. austrinum* var. *orbiculare* Thell. *op. cit.* 240. *L. austrinum* var. *conspicuiflorum* Thell. Fedde Rep. Sp. Nov. 11: 309. 1912 (with some doubt). *L. lasiocarpum* var. *tenuipes* of authors, but not of Wats. Proc. Am. Acad. 17: 322. 1882.

Plants mostly freely branched above to branched from base only, strigose to hirsutulose-hispidulose, the hairs as much as 1 mm. long; pedicels from subequal to twice the length of fruits, flattened slightly, scarcely twice as broad as thick, usually glabrous on lower surfaces. Pl. 16, fig. 23.

Material seen. MEXICO: Matamoras, *Berlandier 2488;* San Luis Potosi, Estacion de Catorce, *Pennell 17561,* 2 of 3 plants with glabrous fruits (US); Tamaulipas, near Victoria, *Palmer 111,* 12 km. northwest of Palmillas, *Stanford et al.;* Nuevo Leon, Monterrey, *Palmer 38, 42,* isotype of Thellung's var. *orbiculare* (US); 35 miles south of Monterrey, *White 1641,* near Monterrey, *Sargent* and *Trelease 30, Mueller* and *Mueller 547,* Linares, *Frye* and *Frye 2517, 2522,* Galeana, *Chase 7748, Taylor 43, ca.* 15 miles southwest of Galeana, *Mueller* and *Mueller 784,* near Sabinas Hildalgo, *Frye* and *Frye 2433, Chase 7038,* Derrumbadero, *Mueller 2556.* UNITED STATES: Texas, Kerrville, Kerr County, *Heller 1651,* type collection of *L. austrinum* (W); Maravillas Creek, Brewster County, *Cory* in 1939 (W); Fort Worth, *Ruth 4* (NY); Dallas, *Reverchon 2726* (G), *Bush 583* (NY).

The following Mexican collections are more or less intermediate in character between var. *orbiculare* and var. *typicum:* Monterrey, *C. T. Dodge 1;* Saltillo, Coahuila, *Palmer 196, 531, 753;* near Musquiz, Coahuila, *White 1846;* 59 km. south of Saltillo, *Stanford et al. 292.*

It is rather regrettable that the name to be used for this variety is somewhat misleading, since the bulk of the material does not have orbicular fruits.

On the whole, this is the most puzzling of the entities included under *L. lasiocarpum.* In the first place, when Watson described the variety *tenuipes* he cited, as belonging to it, certain specimens, such as *Schaffner 145,* which belong under *L. virginicum* var. *pubescens.* He was well aware of the peculiar nature of the type specimen and of its position in the species, since it is glabrous-fruited, and looks much like *L. densiflorum* var. *ramosum*. In fact, the type itself could be placed in either *L. densiflorum* or *L. lasiocarpum* with equal reason, if it were not known that it was found far out of the normal range of the former species; also, of course, the presence of petals nearly as long as the sepals is an unusual condition for *L. densiflorum*. It therefore might be considered to be a glabrous-fruited plant of *L. lasiocarpum*, since glabrosity of the fruits is by no means rare in this species. If the type specimen, alone, were to be considered, I should be inclined to believe that Watson was dealing with a plant referrable to *L. lasiocarpum*. Two isotypes (US), however, can with less hesitation be assigned to *L. virginicum* var. *pubescens*, so it is felt that Watson's varietal name *tenuipes* belongs to some entity under *L. virginicum*, even though it has been applied by most workers to this phase of *L. lasiocarpum*.

Thellung and the author both accorded *L. austrinum* specific status in previous work. The type consists of plants that have pubescent silicles, and is similar, in habit and leaf-character, to Mexican material of *L. lasiocarpum*. There is every degree of intergradation between the two in fruit size, pubescence, and other characters. Consideration of one collection (*V. H. Chase 7748*), for instance, shows the following variation: the sheet at Gray Herbarium contains two very similar plants, one with glabrous silicles, the other with very pubescent fruits, whereas that at Missouri Botanic Garden includes two plants, one glabrous-fruited, the other pubescent-margined; the sheet at Field Museum contains three plants, all with fairly numerous marginal hairs on the fruits.

The specimens of the type of *L. austrinum* (*Heller 1651*), have no basal leaves, and the cauline are but 2 to 3 mm. broad. The plants tend to be erect and simple at the base. Such plants are to be found in considerable abundance between Kerr County, Texas, and Monterrey, Mexico. Another phase of the plant that commonly has been called *L. austrinum* is a broad-leaved form, the cauline leaves being as much as 15 mm. wide. It is exemplified by the following collections. Mexico: Monterrey, *Palmer 38*, *Gregg* (G, MBG), *Sargent* and *Trelease 31;* near Victoria, Tamaulipas, *Palmer 559*. Texas: Brewster County, *Sperry T594*, *Warnock 64;* Mission, *H. C. Hanson 323* (G). The extremes of the two phases would scarcely be considered to belong to the same variety. However, some sheets (*Palmer 38, 42* [G], and *111, 559* [US]), indicate that there is enough variation due to ecological conditions to account for this apparent discrepancy in leaf character. There is also evidence that part, at least, of this apparent difference is due to the early drying and shedding of these broader leaves in the bulk of this material. The type (*Heller 1651*) was originally identified as *L. lasiocarpum* var. *tenuipes*. It is almost perfectly matched by many specimens from Monterrey, Mexico (such as *Frye* and *Frye 2517*).

I have not seen the type of *L. austrinum* var. *conspicuiflorum* of Thellung (Garcia, Nuevo Leon, *R. Endlich* in 1905), which was at Berlin, so cannot be sure it belongs here.

14f. L. LASIOCARPUM var. WRIGHTII (Gray) C. L. Hitchc. *op. cit.* 289.

Whole plant densely hispidulous, the hairs 0.5–1.2 mm. long, usually with somewhat pustular bases; cauline leaves mostly pinnatifid, the ultimate divisions 1–5 mm. broad; pedicels mostly at least 0.5 mm. broad, not more than $\frac{1}{6}$–$\frac{1}{4}$ as thick; glands as much as 0.5 mm. long; silicles 3.5–4 mm. long, densely hispidulous.

Mexican material seen: Rio Grande Valley near Diaz, Coahuila, *Pringle 8317*. The two following Texan collections are similar to var. *Wrightii* in most respects, but have silicles pubescent on the margins only: Carrizo Springs, *Whitehouse 802* (NY), Hebbronville, *Whitehouse* in 1934 (NY).

14g. L. LASIOCARPUM var. **Palmeri** (Wats.) comb. nov. *L. Palmeri* Wats. Proc. Am. Acad. 24: 39. 1889. *L. lasiocarpum* subsp. *Palmeri* (Wats.) Thell. *op. cit.* 267; *L. lasiocarpum* var. *typicum* C. L. Hitchc. *op. cit.* 290, in part.

Plants 3–15 cm. tall, more or less prostrate, densely hirsutulous with hairs to 0.5 mm. long; leaves pinnatifid or bipinnatifid, the segments 1–2 (3) mm. broad; racemes scarcely exceeding basal leaves, 1–3 (7) cm. long, densely crowded; pedicels very strongly flattened, *ca.* 0.6 mm. broad, not over $\frac{1}{4}$ as thick, usually soft-pubescent on both sides; silicles *ca.* 4 mm. long, oblong-ovate, densely pubescent to glabrous, sinuses $\frac{1}{6}$–$\frac{1}{5}$ length of fruit.

Mexican material seen. BAJA CALIFORNIA: Los Angeles Bay, *Palmer 560* (type collection, C, G, US); 10 miles west of Los Angeles Bay, *Wiggins 7673* (US); 14 miles northeast of Punta Prieta on road to Desengana Mine, *Wiggins 7644* (S, US).

This entity, formerly merged by the writer with var. *typicum*, is perhaps the most distinctive variant in the species, and may well merit status as a subspecies, rather than a variety. It has the habit of *L. latipes* and *L. dictyotum*, but the fruit shape, venation, and pubescence set it apart from them. It is most similar to var. *Wrightii*, but the finely dissected leaves, crowded racemes, and soft pubescence are sufficient to distinguish it from that variety. Wiggins' collections indicate that it is an established plant.

15. **Lepidium pinnatisectum** (Schulz) comb. nov. *L. virginicum*. L. var. *pinnatisectum* O. E. Schulz, Urb. Symb. Ant. 3: 495. 1903. *L. virginicum* L. subsp. *eu-virginicum* Thell. var. *pinnatisectum* (Schulz) Thell. *op. cit.* 224, 229, in part only.

Plants annual, 5–20 cm. tall, the few basal branches finely strigillose with curled hairs 0.1–0.2 mm. long; basal leaves few, 3–6 cm. long, sparsely strigillose beneath, lyrate-pinnatifid, the 5–9 pinnae few-toothed to entire, 3–10 mm. broad, petioles subequal to blades, cauline leaves smaller and less compounded, the upper ones few-toothed, 2–6 mm. broad, sparsely strigillose below, the margins usually coarsely ciliate-strigillose with short curved hairs; racemes few, 3–10 cm. long, loosely-flowered and open; pedicels from about equal to fruits to twice as long, spreading to slightly reflexed, slightly flattened, scarcely twice as broad as thick, finely pubescent-strigillose on upper surfaces, glabrous on lower; sepals scarcely 1 mm. long, glabrous, caducous; petals wanting or but tiny linear vestiges; stamens 2; glands 4, *ca.* 0.2 mm. long, lanceolate; silicles *ca.* 3 mm. long, nearly perfectly rotund, lightly veined, margins and adjacent surfaces sparsely pubescent with very short coarse hairs, sinuses scarcely $\frac{1}{10}$ length of fruit, open; styles lacking; seeds *ca.* 1.5 mm. long; cotyledons incumbent. Pl. 16, fig. 18.

Material seen. HAITI: "common and abundant along dry tracts near Cabaret," Baie de Moustiques, January 12–18, 1929, *E. C.* and *G. M. Leonard 12048* (G, NY, US).

The fact that the collectors remarked at the prevalence of the species makes it seem certain that it was common at the time of collection. The fifteen plants of their collection that I have seen are remarkable for their great uniformity, there being scarcely any variation in plant size, leaf character, or flower or fruit.

The collection was first identified as *L. virginicum,* the common species of *Lepidium* in the West Indies. However, these plants differ in being apetalous, and in having more flattened pedicels, pubescent fruits, and incumbent cotyledons. They are more similar to *L. viriginicum* var. *pubescens* but differ from it, too, in being apetalous and in having pubescent fruits. Of course, either of these conditions is occasionally met in plants included in *L. virginicum* var. *pubescens,* but these plants do not have the general habit of that variety, even of depauperate specimens thereof. They are also suggestive of *L. lasiocarpum,* but are sufficiently different from that species in pubescence, rounded fruit, almost complete lack of petals, and less flattened pedicels to make it seem unlikely that they represent an insular introduction of that southwestern species.

If the collectors had not noted the habitat "along dry tracts," one would suspect these plants to be ones that had grown in partial shade as the large, apparently more or less tender leaves and elongate racemes suggest such a habitat.

I am not certain the plants described here are the same as those comprising Schulz's type (Porto Rico, prope Mayagüez, *L. Krug 29*), but that collection, too, was said to be suggestive of *L. virginicum,* differing because of the pinnate leaves and lack of petals. Thellung listed it for Mexico and the United States, as well as the West Indies. I have seen no other material identical with this Leonard collection, so feel confident that Thellung did not interpret Schulz's variety correctly.

16. **Lepidium filicaule** C. L. Hitchcock sp. nov. Annui, caulibus simplicibus vel ad basim ramosis, 5–20 cm. altis, hirsutulosis, pilis 0.2–0.4 mm. longis, patentibus; foliis basi paucis, 3–8 cm. longis, saepe lyrato-pinnatifidis vel lobatis, pinnis paucis, 3–12 mm. latis, petiolis longis gracilisque, foliis caulinis parvioribus, saepe serrulatis, 3–6 mm. latis, sparse hirsutulosis; racemis paucis, 3–10 cm. longis, paucifloribus; pedicellis siliculis aequalibus, patentibus, leviter compressis; sepalis saepe linearibus et $\frac{2}{3}$ longitudinis sepalorum, vel parvioribus, vel absentibus; staminibus 2; glandulis 4, 0.1 mm. longis; siliculis saepe 2.5–3.5 mm. longis, ovato-ellipticis, glabris, reticulatis sine discrimine, ad apicis alatis; sinibus $\frac{1}{10}$–$\frac{1}{8}$ siliculorum longitudinis aequalibus, latis; stilibus absentibus; seminibus 1–1.25 mm. longis; cotyledonibus incumbentibus.

Annuals, simple or branched from base, 5–20 cm. tall, the branches very slender, finely hirsutulous, the hairs 0.2–0.4 mm. long, spreading; basal leaves few, 3–8 cm. long, mostly lyrate-pinnatifid or lobed, the lobes or pinnae few, 3–12 mm. broad, the petioles long and slender, cauline leaves similar but reduced, often merely serrulate, 3–6 mm. broad, sparsely hirsutulous; racemes few, 3–10 cm. long, loosely flowered; pedicels *ca.* equal to fruits, spreading, flattened slightly, scarcely twice as broad as thick, lower surfaces glabrous, upper surfaces finely short-hirsute as is the axis of the raceme; sepals *ca.* 0.75 mm. long, sparsely hairy on back, caducous; petals mostly linear vestiges *ca.* $\frac{1}{2}$–$\frac{2}{3}$ as long as sepals, or more reduced or even lacking; stamens 2; glands 4, scarcely 0.1 mm. long, oblong-lanceolate; silicles mostly *ca.* 2.5–3.5 mm. long, ovate-elliptic to oval-elliptic, glabrous, very lightly veined, sinuses $\frac{1}{10}$–$\frac{1}{8}$ length of fruit, open, the silicles very slightly wing-tipped; styles lacking; seeds 1–1.25 mm. long; cotyledons incumbent. Pl. 16, fig. 24.

Type. Rocks of east shore, Ambergris Cay, the Caicos Group of Bahamas Islands, March 12, 1911, *C. F.* and *C. M. Millspaugh 9309* (F; isotypes, G, NY).

Other material seen. South Caicos, Caicos Islands, *Wilson 7623* (F, G, NY).

These plants have all been identified as *L. virginicum* and look not unlike depauperate specimens of that species. They are the only collections of *Lepidium* I have seen from the Caicos Islands and are remarkably alike in habit, pubescence, and flower and fruits, varying in leaf character only. Since they include about twenty plants, some of which were collected in December, the rest in March, it would seem certain that they are representative of the entity as it occurs in this part of the Bahamas Islands, and that they are not depauperate specimens of *L. virginicum* such as the collection from Inagua (*Nash* and *Taylor 1461*). The pedicels of these plants are too large and too flat to be those of *L. virginicum,* the fruits are more nearly elliptic, and the lack of petals and the incumbent cotyledons are unlike *L. virginicum.* The plants are most suggestive of *L. pinnatisectum,* but differ in pubescence (hairs finer and more abundant), fruit shape, and lack of pubescence on the silicles. The glands are apparently shorter than in that species, also.

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A NEW SPECIES OF LINUM FROM THE COAST RANGES OF CALIFORNIA

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In the preparation of a monograph of the section *Hesperolinon* Gray, genus *Linum* Tourn. ex Linn., one new species has been described; it is published separately herein.

Linum bicarpellatum sp. nov. Herba annua, 8–20 cm. alta; inflorescentia paniculata cymulis plerumque dichasialibus ramis secundariis oppositis; sepalis binis exterioribus saepe porrectis, iis ternis interioribus minoribus vix porrectis; petalis 3–4 mm. longis, luteis, appendiculis lateralibus crassis, eo medio oblongo pubescente; tubo stamineo 10-dentato, filamentis 3 mm. longis, antheris 1.5 mm. longis; ovario 2-carpellato; stylis binis 3 mm. longis.

Stem 8–20 (mostly 15) cm. tall, puberulous near the forks of the branches; leaves linear, narrowed at base, strongly channelled, 15–20 mm. long, 1–1.5 mm. wide, stipular glands present except at bases of bracts; branches of inflorescence spreading, secondary branches predominately opposite, forming a dichasium, flowers scattered, the ultimate branchlets bearing loose clusters of 2–3 flowers on pedicels 0.5–2 mm. long, fruiting pedicels 1–2 mm. long near tips of branches, 4–5 (or up to 12) mm. long in lower axils; sepals 2–3 mm. long, 0.5–1 mm. wide, acute, the two outer sepals often spreading in both bud and flower, the three inner sepals smaller and connivent in bud, only slightly spreading at anthesis; petals 3–4 mm. long, 2–3 mm. wide, bright yellow often tinged with red on back, horizontally spreading at anthesis, lateral appendages thickish, ventrally glandular-papillate or with a few scattered hairs, united to central oblong appendage, this hairy ventrally; stamen cup 10-toothed, filaments 3 mm. long, anthers 1.5 mm. long, yellow, pollen grains yellow; ovary 2-carpellary (infrequently 3), ovules 4 (infrequently 6); styles 2 (infrequently 3), 3 mm. long; capsule equal or slightly shorter than sepals, false septa one-third complete.

Range. Chaparral and openly wooded areas, Lake and Napa counties of the inner north coast ranges, California.

Specimens examined. Lake County: three miles east of Middletown, May 27, 1937, *H. K. Sharsmith 3949* (type, Herb. Univ. Calif. no. 694109, duplicates distributed to various herbaria); eight miles southeast of Middletown, *Keck 2464* (Herb. Univ. Calif.); four miles east of Middletown, *Mason 5689* (Herb. Univ. Calif.). Napa County: Butts Canyon near Aetna Springs, 1911, *Brandegee* (Herb. Univ. Calif.).

This hitherto unrecognized species is easily mistaken for *Linum Clevelandii* because of the bright yellow petals and the similarity in habit and habitat. Undoubtedly the two species are closely related, but they are readily distinguished on the basis of carpel number. *Linum bicarpellatum* is the only bicarpellary species in the otherwise tricarpellary section *Hesperolinon.* Infrequently a tricarpellary flower will be found in *L. bicarpellatum,* and as infrequently the reverse is true in *L. Clevelandii,* but these instances are rare.

Other features distinguishing *Linum bicarpellatum* from *L. Clevelandii* are as follows: in *L. bicarpellatum* the secondary branches of the inflorescence are mostly opposite, forming a dichasium, while in *L. Clevelandii* the inflorescence branches are mostly alternate, forming a monochasium. The sepals, because of a difference in position, appear more obviously subequal in *L. bicarpellatum,* the three inner being connivent, the two outer spreading. Petals, filaments, and styles average one to two millimeters longer in *L. bicarpellatum* than in *L. Clevelandii.* Finally, the stamen cup at the base of the filaments is 10-toothed in *L. bicarpellatum,* 5-toothed in *L. Clevelandii.*

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NOTES AND NEWS

We welcome the receipt of Volume one, number one, of "Wrightia," a new journal of botany emanating from the Institute of Technology and Plant Industry, Southern Methodist University, under the editorship of Dr. C. L. Lundell. Judging from the contents its interests are wide and it gives promise of a vigorous and valuable future.

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